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THE WESTERN'S ELEVENTH ANNUAL.

Perusing our reports of the transactions of the annual gatherings of the Western Gas Association must seem almost a trifle monotonous to our readers, in that we never can say that these assemblages were other than solidly attractive and genuinely beneficial to the participants, in particular, and to the fraternity at large, in general. And there is small reason for regret when seeming monotony can be traced back to such a cause; in fact we shall undoubtedly be forgiven for wishing that more monotony of the same stamp could be written down concerning all the records made during past, and to be encountered during the decades yet to come. Well, our verdict in respect of the Eleventh Annual is that it was an unqualified success; and did we write page after page only that pronounced conclusion could be uttered.

Mr. Kinsley ought to be petitioned to remove that meeting hall of his to Cincinnati—where the 12th annual will be duly proceeded with—for the unpleasant memories of some others of the Western's trysting places were made by it to seem but as phantoms of the most gauzy gossamer. Perfect in its every detail—that must be the criticism. Tuesday, May 9, was ushered in by lowering clouds, but they only "lowered" and did not break. It made scant difference, however, to the massing gas men, who being used to the fray with days "dark and dreary," have learned not to fear that which is concealed within the ordinarily dreaded *nimbus* pall. President McMillin's eyes wandered over the rousing assemblage, and there was no "dull thud" about the sound of the original gavel fall; it was sharp and resonant, thus betokening (at least a spiritualistically inclined member so explained) the influence and presence of the spirit of joy. The roll call (and the tintinnabulation of Secretary Littleton's voice seemed to denote his close concord with the aforesaid spirit) shows what a mighty gathering was present, although it also unluckily shows, or rather fails to reveal the physical presence of some of the giants usually eager for the fray. And, then, the list of new members! How much does it speak for the growth and future increased value of the matron whose tin wedding reception was but a year ago. The Eastern delegation was a strong one, and while our official record does not speak for one whose presence was welcomed warmly, nevertheless Mr. Barker, of the Massachusetts State Gas Commission, was looked on and greeted as a brother who might speak with authority. Of the additions to the membership list, perhaps the best received was that of the man who had the courage some years ago—when such assertions were not received with extreme favor by gas men at large—to say that cheap gas was what was wanted; and was what would have to be in the near future. In fact a little later on he proved how money could be made by selling gas at the dollar rate. Before leaving the membership list we would say that Prof. Mendenhall's election to Honorary Membership was but giving him spurs that had been won in knightly fashion. The Professor's promised lecture (delivered on the afternoon of the second day) was in all respects an intellectual treat.

Coming to the chief executive, all is said when it is remarked that McMillin was in the chair. His parliamentary *savoir faire* never faltered, and to that tact may be traced the facility with which the sessions were carried along. His annual message ought only be discussed at full length were one to attempt to refer to each salient point that may be encountered in its almost every paragraph. At the present time we will, and hurriedly, point out only two of these, and while unwilling to concede the point absolutely pronounced in favor of one, in respect of the other we can give a hearty assent. The President says that incandescent lighting is making equal progress with arc lighting; and from this opinion, and without any desire to do wrong to the figures on which the President's verdict is undoubtedly founded, we must dissent—at least so far as the Eastern and most, if not all, of the Middle and Southern States are concerned. However, we can cordially agree with him in "That gas will remain the light of the future for the masses there can at present be no doubt." Gas men want the favor of the "masses," and having it, they need not greatly fear the whims of the "classes." Where we can stand in true accord is on the question of the value of State Gas Commissions, as shown by the past working of the only sample afforded—that of the Massachusetts Commission—which, standing as a bulwark, acts as a shield retarding the indignant consumer and the cupidity

of the speculator, holding both back from either inane or venal assault upon honestly invested capital. President McMillin's address will add to his laurels, for it is ripe in thought and word. Between the annual address and Secretary Littleton's preliminary hints, we fail to see what we can say in respect of the papers which has not already been said. The communications abound in merit, and possibly those which will attract the largest share of attention are from Mr. McDonald, Mr. Thompson and Mr. Chollar. And the latter gentleman is quite right in saying he had discovered "A Paradoxical Box," and it is not the first one of that nature discovered by him; since our columns have shown that he not long since convicted the photometer of having, at times and in certain respects, shown contradictory tendencies. We were sorry to hear that which one paper (or report) taught, and this is in respect of the conclusions forced upon the committee appointed to inquire into the feasibility of founding an Institute. Its seeming inopportunity must, if a fair reason for this is to be established, be laid at the door of indifference or neglect. To our mind the time for such a movement is ripe, and its field must be acknowledged to embrace a large and tillable acreage. Passing on from the papers, in respect of which we would again stop a moment to say how thoroughly enjoyable *all* were, we come to the portion of the programme that pertained to the election of the incoming executive staff, and we once more join in the general acclaim that greeted President-elect Ramsdell. That wideawake Vincennes gentleman we fear did not, before the present month of May, understand how thoroughly popular a "party from Indiana" he is; but the "spirit of joy" almost took a visible shape when Kinsley's rafters (the latter are pretty well concealed, however) re-echoed the rappings from the table tops right after the announcement of the name chosen to guide the Association safely through the tides that will ebb and flow beneath it in the coming year. Who else but the genial Littleton could follow on the list of active caretakers; whereupon the rafters rang again.

In unison with the technical triumphs of the sessions must be tuned the story of the pleasures of the May-days in Chicago. The hosts of the occasion, prominent among them being the Gas Companies of the city, were novices neither in inception nor execution; and their choices in "workers" in this labor of love must be written down as of the active sort—in fact, Chicago is Chicago; and her people are—well, not of the dilatory sort. In fact, the sub-committee of the hosts' committee—Messrs. Henry Pratt (Chairman), Geo. C. Hicks, F. R. Persons (about whom hangs a tale), C. D. Bradley, H. D. Harper, and John Stout—cannot receive too high praise for their effective and sustained efforts in ministering to their guests; and it should be said that many of the gas men were softly freighted with gentle reminders that wives and daughters could see value in hovering over the scene. The banquet, which was set out in Kinsley's unapproachable and irreproachable style, was a feast long to be remembered. It seems our suggestion of a year or two back, that Capt. White should be appointed regular toastmaster to the Associations, has been tacitly adopted. The mention of his name in that capacity at Kinsley's goes to prove, and does prove, that no hiatus could develop in the feast of reason, no matter what gap might occur in the viands, or what ravages drought could make in the various gurgling streams. The weather clerk threatened to veto the proposed excursion on the billowy bosom of Chicago's own ocean, but a slight let up in the sullen storm of Friday morning gave the committee heart of hope, whereat the word was passed to brave the vasty deep. The staunch craft chosen to carry the pleasurers soon showed her prowess, and a little later on Kinsley once again, this time at sea, displayed the deftness of his art in the shape of an excellent lunch, which speedily disappeared before the expertness of the voyagers. And here comes in the tale about one of the persons. Just prior to the disappearance of the caterer's effort, Capt. White arose and, in a voice "trembling with emotion," said he had been deputized by the ladies of the party to call out Mr. F. R. Persons, of the Committee on Entertainment, and cane him on their account and charge—because they owed him much for his attentions. Having said this, the Captain presented the blushing and astonished Committeeman with a handsome gold-mounted walking stick, which bore the inscription, "Ladies of the Gas Association to F. R. Persons, May 11, 1888." And here we draw the curtain on the recipient, although justice compels us to add that his blushes did not last as long as did his smiles. We should have said that the Committee's plan of campaign included a visit to the wonderful panorama, on view in Chicago, portraying the Battle of Gettysburg, and carriage riding and sight-seeing *ad lib.*

The meeting is over; we were glad it was our pleasure to be present at it; we wish to return thanks to our kind hosts; and we wish to put ourselves on record as saying that the Western Association seems bent each year on outstripping its former efforts—no matter on what successful scale the latter may have been carried out.

[The telegraph fortunately brought to us, at the hour of going to press, particulars concerning a most pleasing and completely impromptu sequel or addendum to the meeting. Those who yet tarried in the vicinity of the Grand Pacific Hotel on the evening of the 12th were not aimless in their waiting. The every-inch-a-man Secretary of the Association was about to depart for his home at Quincy when his progress was interrupted by a request from one of the lingerers that a few friends, assembled in one of the hotel reception rooms, wished to bid him good-bye. Hurriedly going to the room designated, Bro. Littleton was confronted by a group of tried and true ones, from out of whose ranks marched Mr. H. B. Leach, of Taunton, Mass., and handed to the astonished Secretary a testimonial—in the shape of a massive watch chain and an artistic pendant—of the esteem in which he was held by his friends—Littleton has no foes. Mr. Leach made a most happy presentation speech, and Littleton's reply would have sounded much better were it not for certain unnatural lumps which suddenly developed in the region o his throat.]

BRIEFLY TOLD.

Brooklyn (N. Y.) Threatened with another Gas Company.—The city at the eastern end of the big bridge already rejoices in the possession of seven gas companies, more or less distinct in their capacity as dispensers of a lighting medium. This qualification appears to be a necessity towards enabling an outsider to understand just how far the separation of interest goes; for out of the seven only one (the Nassau) fails to pay tribute in one shape or another to the Fulton Municipal Company, which combination would not now be receiving that homage due to an easily-acquired greatness, if the advice of the late JamesHow had been followed when he originally offered the same. Indeed the egg-state of the Benedict enterprise gave but so small a promise of the vigorous bantling that subsequently hopped from the shell, thanks mainly to the judicious system of incubation devised by General Jordan, as to cause Mr. How's associates in the old Brooklyn Company to confidently predict that the egg would never quicken. Mr. How was right; but it took time to prove it. However, with 7 more or less "independent" companies in the field, one might be excused for thinking that Brooklyn was plentifully supplied with gas purveying establishments. It already has a Peoples Company and also a Citizens, but now it is threatened with a combination to be known to fame as the Peoples and Consumers Company—whether it is to find a royal road to fortune or not is, of course, still in the egg state—and the combination is not altogether brand new; for its incorporators came to the surface about a year or so ago, at which time they hired halls (for one-night stands only) in divers portions of the city, in which harangues were had for the purpose of stimulating a "healthy public desire" on the part of the people to subscribe to stock, etc. Unfortunately, in imitation of the style of the ancient calendographer, we might say they (the hall-hiring haranguers) were called upon to look out for squalls, which assumed the shape of a breeze from the Legislature commanding gas to be sold in Brooklyn for $1.60 per M. Bowed down by the storm, they went into harbor, temporarily; but are now prepared once more to scud before the wind. At least we judge so from the fact that Mr. Lindley Murray (Alas! this Lindley is a retail furniture dealer), President of the Company, has been hiring halls again, with the avowed purpose of calling attention to the beauties of the prospectus. The capital stock of the Company is fixed at $3,000,000, but only 20 shares (par value $10) will be sold to any one investor—hence the necessity for hiring halls, since though many takers are wanted but few shares can be "called"—individually. President Murray is not the only retail furniture dealer in the management, for an examination of the list of Trustees discloses the names of two, and possibly three other handlers of solid—and veneered—wood and willow ware articles to make the house beautiful. In view of this we would respectfully urge upon the Trustees the advisability of altering the Company's title to that of the "Solid and Veneered Gas Supply Company." Stockholders and the general public are to receive gas at $1 per thousand; but, according to Lindley, the dividends to the former will in all probability reduce the cost of their carburetted hydrogen to 70 cents per M.

The Difference between Purchase and Sale.—In our "Item Columns" we report the bids opened by Director Wagner in respect of the proposed purchase of tar produced on the Philadelphia gas works. It will be seen that the highest bidder only offers—estimating that each ton of gas coal carbonized will yield 12 gallons tar—2.19 cents per gallon; but when it comes to selling the tar over again—at least in Chicago—the "tar ring," which has had the gas maker of this country by the throat for some years, is not so modest. For instance, Street Commissioner Swift, of Chicago, early this month solicited proposals from tar contractors for the supply to the city, during the coming year, of several thousand barrels of coal tar—this material is largely used for street paving in Chicago—and the figures submitted were the following: Barrett & Kimball wanted 8.45 cents per gallon; Chas. H. Connor, of Louisville, Ky., would be satisfied with 8.20 cents; and J. Wilkes Ford offered to supply "pitch tar" at 9.50 cents And this is a concession from the ring; for the lowest figure on the previous advertising was 10 cents per gallon. Pity a poor tar distiller, and his ratio of profit.

Annual Meeting, Winona, Minn.—The annual election of the Winona Gas Light Company resulted as follows: Directors, Messrs. H. W. Lamberton, T. Wilson, W. Mitchell, C. H. Porter, F. M. Cockerell, H. Stevens and H. C. Bolcom. Officers: President, H. W. Lamberton; Secretary and Manager, H. C. Bolcom. We have heard much about the great strides taken by the electric light in Winona, but we notice that Brother Bolcom advised the Directors to authorize the construction of a new holder, and they told him to go ahead.

[Prepared for the JOURNAL.]

Photometric Gas Testing.

By C. W. HINMAN.*

Photometry consists in comparing the light to be tested with another which is used as a standard. In all accurate testing the observations are made so that the light from one source is just equal to the light from the other at the point where they are compared; and if at first the lights are not equal at the point under observation some change is made to make them equal. After finding the point that receives equal amounts of light from the two sources the relative intensity of the lights is given by the law that the light from any source decreases directly as the square of the distance of the point under consideration from the source of light.

The law can be proved by the following considerations: Let a luminous point be in the center of two perfectly transparent spherical shells, one of the shells having a radius n times that of the other. The total amount of light passing through each shell is the same, as it is all the light given out by the luminous point. If the surface of one shell is a, that of the other is $a n^2$, as the surfaces of spheres are proportional to the squares of their radii. Hence the quantity of light that is spread over the surface a, at one distance, is spread over the surface $a n^2$ at a distance n times the first; and if the amount of light per unit of area is unity in the first case, it is $\frac{1}{n^2}$ in the second. That is, the light is inversely as the square of the distance.

There are various methods of comparing the light from two sources. One method is by observing the amount of light reflected from a white opaque surface—opaque rods being usually placed in front of the surface to facilitate the comparison. This method was used by Rumford, but is

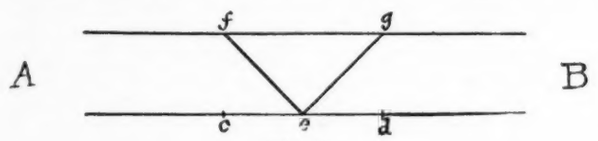


Fig. 1.

not much used at present. Another method is by observing the amount of light transmitted by some translucent disc, such as paper, ground glass, or porcelain. This method is considerably used on the Continent of Europe.

Another method, and the one most generally employed, makes use of both the reflected and the transmitted light. For this purpose a paper disc is made translucent by melted spermaceti, or some similar substance, a spot in the center of the paper being left unaltered. This is the Bunsen disc. The Leeson disc is sometimes used instead of the Bunsen disc. It consists of a sheet of thin paper, with a hole, usually star-shaped, cut in its center, inclosed between two plain sheets of similar paper. This disc is placed between two sources of light, and both sides of the disc are observed. It is desirable to make the disc just translucent enough so that the unaltered part reflects just as much light as the greased part transmits. In this case, when the two sides of the disc receive equal quantities of light there is no spot visible, and the surface of the disc appears uniform when viewed from either side. If the amounts of light transmitted and reflected are unequal, the disc has to be placed in different positions to secure uniformity of appearance, according to which side is observed.

When mirrors are used, so that both sides of the disc can be observed at the same time, although it is desirable to have the disc reflect and transmit equal quantities of light, it is not necessary; for in this case, besides comparing the reflected with the transmitted light, the light reflected from one side of the disc is compared with that reflected from the other. Also, the transmitted light from one source can be compared with the transmitted light from the other, and the two sides of the disc appear the same, even if the greased part has a different appearance from the part that is not greased. Bunsen's disc, with mirrors and sight-box, is shown in Fig. 3. A and B are the two lights to be compared, $c\,d$ is the disc, and $a\,c$ and $c\,b$ are the mirrors.

If the two lights are of the same color, Bunsen's disc provided with mirrors gives a means of comparing their relative intensity with an error of less than one per cent. If the lights are of different colors, Bunsen's disc is perhaps as available as any other means; but the comparison is difficult in any case.

The relative position of the disc and the lights varies in different systems of photometry; but generally, when either the comparison by transmitted light or by reflected light is used alone, both lights are on the same side of the disc. However, in Ritchie's photometer, which uses only transmitted light, the paper screen is between the two lights, and, by means of two inclined mirrors, has one-half of its surface illuminated by one light and the other half by the other light. The arrangement of the box, with mirrors and screen, is shown in the diagram, Fig. 1.

The light from the two sources A and B is reflected by the mirrors $e\,f$ and $e\,g$ onto the screen $c\,d$. In the French system, and also in Elster's photometer, the two lights A and B (Fig. 2) are placed on either side of

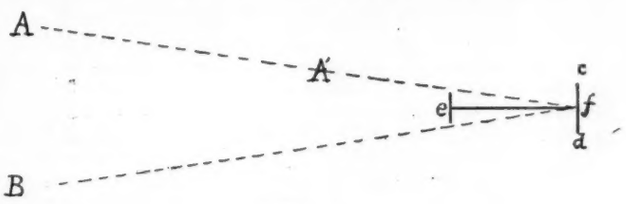


Fig. 2.

a thin opaque screen $e\,f$, the paper screen for comparing the lights being shown at $c\,d$. In the French system the standard of light (a Carcel lamp) is placed at A, and the gas to be tested is burned at B; $A\,f$ being equal to $B\,f$, and the angle $A\,f\,e$ to the angle $B\,f\,e$.

In Elster's photometer the gas is burned at a fixed rate at B, and the disc $c\,d$ is moved along the line $e\,f$ until its surface is equally illuminated—the standard light being fixed at A'. The Elster photometer cannot be used to compare two nearly equal lights, and has not a wide range of capacity. It is, however, a compact instrument.

There are two methods of making the lights equal at the point of comparison. The simplest is that used by the French—viz., by burning more or less gas. The other method is by altering the relative positions of the disc and the two lights.

The following are some of the arrangements for using the Bunsen disc. The usual arrangement is to have both lights fixed, and only the disc between them movable. This is decidedly the best arrangement, as it can conveniently be used to test lights of equal or very different powers, and does not require either flame to be moved; and flames become unsteady if moved about. The Church and Mann photometer was made with the standard light at a fixed distance from the disc, and both were moved toward or away from the light to be tested. This arrange-

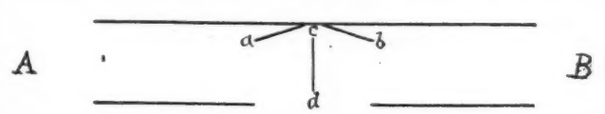
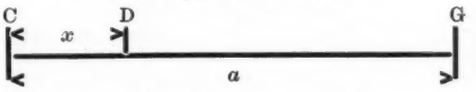


Fig. 3.

ment always gave the same degree of illumination on the disc. In the Evans photometer the light to be tested and the disc are stationary, and the standard light moves. This does not require the observer to move, and facilitates construction when a closed photometer is used. Both these photometers have the great disadvantage of requiring the standard light to be moved.

The formulas for graduating the bars of the various photometers are as follows, the letters having the same signification in each case: C is the standard light; G is the light to be tested; D is the disc; n is the number of times the light to be tested exceeds the standard; a is the constant distance, and x the varying distance.

I.—*Ordinary Bunsen Photometer.*



$$n = \frac{(a-x)^2}{x^2} \qquad x = \frac{a}{\sqrt{n+1}}$$

II.—*Elster's Photometer.*

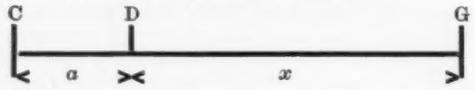
$$n = \frac{(a+x)^2}{x^2} \qquad x = \frac{a}{\sqrt{n-1}}$$

*Inspector of Gas and Gas Meters, State of Massachusetts.

III.—*Evans' Photometer.*

$$n = \frac{a^2}{x^2} \qquad a = \frac{a}{\sqrt{n}}$$

IV.—*Church and Mann Photometer.*



$$n = \frac{x^2}{a^2} \qquad x = \frac{a}{\sqrt{n}}$$

All these photometers, except the first, change their length according to the relative intensities of the lights.

Although a change of one candle in No. IV. makes a greater change in the position of the disc than a change of one candle in No. I., still their is no real gain in accuracy, as the scale of No. I. can be divided and read more accurately than the exact point of equality of the lights can be determined.

The length of a usually adopted in the various photometers is as follows: No. I., 100 inches, or sometimes 60; No. II., 24 inches; No. III., 50 inches; No. IV., 10 inches. With these distances, when a 16-candle gas is tested against one candle, the distance from the candle to the disc is, in No. I., 20 or 12 inches; No. II., 8 inches; No. III., 12½ inches; No. IV., 10 inches. Also, in the French system the light on the disc is about the same as one candle would give at one foot distance. If the 60 inch bar is used with No. I., the amount of illumination on the discs of the various photometers is not very different.

A great deal of attention has been devoted to finding a suitable standard of light, and the search still continues. The following are some of the standards in use and proposed: The candle made of spermaceti is the legal standard in English-speaking countries; the Germans use standard candles made of paraffine; a lamp burning colza oil (Carcel) is the French standard. A somewhat similar lamp burning sperm oil has been proposed by Keates. Both these lamps have chimneys. Lamps somewhat like an ordinary spirit lamp, but burning various combustibles, have been tried. The latest one, and which is well spoken of, is the amyl-acetate lamp of Hefner-Alteneck. Air and pentane vapor mixed in a small holder and burned from an Argand burner, and the same mixture made and burned in one burner, have been recommended by Harcourt. He has recently devised a lamp for burning the vapor of pentane without previously mixing it with air. His previous lamp was complicated and fragile. An ether flame has been proposed. Melted platinum has been adopted by the French electricians; it certainly is not a very portable standard. For testing ordinary gas a very convenient standard is to take a certain definite part of an Argand flame burning the gas which is being tested (Methven standard and Sugg's 10-candle flame).

Candles are convenient and portable, but unless used with considerable judgment are liable to give varying results. The colza oil lamp, and also the sperm oil lamp, are said to require even more judgment and experience than candles. Reports on the amyl-acetate lamp are favorable, except that the color of the light is not quite satisfactory. The pentane standards are said to give nearly constant flames, but are complicated and not easily portable. The Methven slit is scarcely suitable for a standard, as with either very rich or very poor gas it gives a different amount of light than when used with ordinary gas. Ordinarily, however, it gives quick and reliable results with little care.

Undoubtedly before many years the flame of a candle will cease to be a standard for light; but it is not certain that any of the previously mentioned standards will be adopted.

The following considerations apply especially to the ordinary Bunsen photometer using candles.

Whatever style of photometer is adopted it is necessary that the only light falling on the disc shall come from the lights being compared, light from all other sources being carefully excluded. In the older photometers this was accomplished by placing the photometer, which consisted of the two lights and a graduated bar carrying the disc, but without any screens, in the middle of a room painted a lusterless black. All the apparatus was also blackened. This accomplished the object, but the glare of the two lights in the operator's eyes was very objectionable. Screens were then placed between the disc and the lights; and at present still other screens are usually added, sometimes the lights being nearly inclosed, and, in the more complete photometers, dark curtains nearly surround the operator. When thus provided with screens the photometer does not require any darkening of an ordinary room, except to draw dark curtains over the windows. There should be just light enough where the operator is situated to enable him to make the readings and take notes. In another style of photometer the two lights are inclosed in dark boxes of some size, which are connected by a smaller horizontal dark box containing the disc. This horizontal dark box is lined with black velvet or painted a dull black, and provided with numerous screens. The boxes containing the lights should have openings sufficiently large and numerous at both top and bottom to keep the lights well ventilated and yet free from draughts. The photometer room should have a cubic content of at least 1,000 feet, and be well ventilated, yet without draughts. If the photometer is placed near the middle of a room of three or four thousand feet capacity the natural ventillation through the walls of the room is sufficient to keep down the heat, carbonic acid and aqueous vapor produced by the combustion, so that no unfavorable effect is produced. If the ventilation is not sufficient the candles do not burn properly.

A wet meter, graduated to thousandths and provided with spirit levels, a gauge glass and thermometer should be used. If, for any reason, a dry meter is used it should be frequently tested. A governor is usually provided with the photometer, and is useful for making the final adjustment for rate of burning. As the pressure is usually constant during the short interval used in testing, there is no real necessity for using it, and it needs some attention to keep it in order. The ordinary micrometer cock, with worm and wheel for adjusting the flow of gas, has too much back lash. Two stop cocks, one of which has a long arm, are preferable.

It is sometimes difficult to decide just what burner to use in testing the gas. Some laws specify the exact burner to be used; others state that the burner best adapted to the gas is to be used. Sometimes the object of the test is to find the best burner for some particular gas or some special circumstance. A burner which is the best for one gas is not necessarily the best burner to use with some other gas. For example, a burner adapted to petroleum gas would give little light with wood gas, and a burner adapted to wood gas would smoke with petroleum gas. The burners in common use may be divided into two classes, viz., those with chimneys (or Argands) and open burners. Generally speaking, for poor and moderately good gases, the Argand gives the most light, while for rich gases the open burner gives the best result. In a general way, it may be said that below 20 candles, burning 5 feet per hour, the Argand gives the most light Above 30 candles the open burner is the best. Between 20 and 30 candles the composition of the gas determines which burner gives the most light. Of the Argand burners, perhaps Sugg's latest gives as much light as any. For the open burners, the slit burner generally gives more light than the union burner. The tips of the best burners, both Argand and open, are best made of some non-conducting material that is not easily corrodible, such as porcelain or baked steatite. It is well to have a pressure gauge arranged to take both the pressure of the street gas and the pressure at the point of ignition.

The candle balance must be arranged so that the candle can be weighed while burning and without removing it from its place in the photometer. The balance must be delicate enough to indicate one-tenth of a grain with certainty, and still not vibrate too slowly. All the knife edges should have bearing surfaces at least one fourth of an inch long. The ordinary balance beam may be used, and the candle kept directly above the knife-edge by means of a counterweight below; but it is better to split the balance arm and support the candle between the knife-edges at the extremities of each branch, as it lightens the load carried by the knife-edges. The balance is counterweighted so that it is nearly in equilibrium without the candle. The candle can be balanced by adding weight to the opposite pan, or by means of a weight sliding on the beam. The candle may be weighed by weights in the pan, or the beam may be graduated and a sliding weight used. The first method admits of greater exactness, and the last is more convenient. Some experimenters use one candle and some two. Perhaps two candles are more likely to give an average result; but there is so much heat that they must be separated some distance to allow of the formation of proper cups. The exact position of the candle flame should be marked by plumb lines or some similar mark, and the position of the candle balance should be adjustable, so that the flame may be brought into its place.

The disc should be mounted so that it can be moved easily and smoothly and so it can be easily reversed, as some discs give different readings, according to which side is presented to the candle. The disc should be sensitive enough to certainly show a change when it is moved half a candle on the bar.

In making a test it is desirable, in order to save time, to first light the

gas and let it burn while the photometer is being put in adjustment. The following directions apply especially to the ordinary Bunsen photometer:

Level the meter, and make the water line in the gauge-glass right by adding or taking out water. All wet meters tested by me are marked so that the mark on the gauge-glass is at the lower part of the meniscus when both the inlet and outlet are open to the air. Look at the burner and see that the passages are all clear. If an open burner is used see that the flame has a smooth, roundish outline. If the burner is an Argand, clean the chimney and wipe it dry. Light the gas and regulate it to the right rate. The legal rate is 5 feet per hour. If the meter is divided into six-hundredths, 50 divisions per minute equal 5 feet per hour. If the meter is divided into thousandths, 83⅓ divisions equal 5 feet per hour. It is advisable to choose a burner adapted to burning as near 5 feet per hour as possible, and then burn the gas at just the rate best suited to the gas. With an Argand burner the gas gives the most light per unit of volume when it is near the smoking point. With Sugg's No. D, the size best adapted to ordinary coal gas, the flame should not be more than 3½ inches high. With an ordinary slit burner, the flame is about right when the ears at the base of the flame just unite with the body of the flame. See that the mirrors behind the disc are clean. The photometer should be measured to see that the distance between the lights is correct, and also that the candle is the right distance from the part of the scale most used. If the distance between the lights is 100 inches, it should be 20 inches from the 16-candle mark to the candle. The measurement should be made by setting the pointer of the disc holder at the 16-candle mark, and then measuring directly from the disc to the candle. If the distance is not exact, the plumb line, or other mark indicating the position of the candle, should be moved. Of course, this measurement and adjustment need be made only once for each photometer, but the operator should verify it.

The candle should be lighted and allowed to burn at least ten minutes before commencing the test, for unless the candle is burning properly there is no use trying to make a test. The wick should bend to one side side and burn with a glowing end but little larger than any other part of it. The carbonized part of the wick should be little if any smaller than the original wick, and should not droop over too much. A perfect cup of melted spermaceti should be formed. The top of the flame should be rounded, not sharp-pointed and smoky. The flame should be steady and quiet. If a candle does not burn well there is not much that can be done except to improve the ventilation or try another candle. The candles used for testing should always be the English standard. Other candles may give the same results; but it is probable they will not. The English standard candle is uncertain enough without introducing any other uncertainty. When the candle is burning properly place it in its proper position, as indicated by the plumb lines or other marks. If the Methven slit is used all that is necessary is to clean the chimney to the burner, put the apparatus in its proper position, light the gas and regulate the height of the flame.

The candle being in a proper condition, and the gas having been burned long enough so that the supply comes fresh from the main, the test may be proceeded with. If the candle is weighed by means of a rider, set that at zero, move the position of the counterpoise, or change the weight in the pan of the balance, until the candle end of the balance is about two grains heavier than the other. At the next even minute take the reading of the meter to the nearest thousandth. For a timepiece, a common watch or clock with a large distinct second dial can be used, but a minute clock or stop watch is preferable. Watch the index of the balance and note the minute and second when it is at zero. Put 10 or 20 grains in the candle pan, or change the rider that amount. Proceed to take readings of the position of the disc at regular intervals of time. The disc is set at the correct position when both sides present the same appearance. At each setting of the disc it should be moved so that first one side will be better illumined and then the other. The disc should always be moved between each reading, even if it does appear to be set correctly, so that each reading may be independent of those that precede it. After the observer has taken readings for nearly five or ten minutes, he should give his attention to the candle and note the minute and second when the balance index is at zero, Both the first and last movements of the balance should be smooth and steady, with little or no tendency to oscillation. The state of the meter is taken at 6 or 12 minutes from the first reading. It is usually best to add another weight to the pan, and take another set of observations. If the candle has burned at about the right rate, and with the proper appearance, and if the readings have been fairly regular, the determination has been satisfactory. If the time of burning 10 grains of candle has varied more than 15 seconds from five minutes the determination should be considered as only an approximation. With candles the extreme readings should not be more than 1½ candles apart, and, with the Methven slit, less than 1 candle. There should be no sudden jump in the readings. During the readings there should be an occasional glance taken at the candle to see that it is burning properly. The glance must be but momentary, otherwise the eyesight will be temporarily deadened.

When the candle is extinguished the wick should be touched with a piece of spermaceti, so as to saturate it with grease and prevent its smouldering. This leaves the candle so that it soon gets in proper condition when it is again lighted. When lighting the candle it is well to melt a little of the spermaceti by holding the match near it, so that the wick will not be burned up before the spermaceti gets melted.

The temperature of the water in the meter should be observed, and also the height of the barometer. The barometric correction can be made accurately enough by adding or subtracting one per cent. of the amount of gas used for each three-tenths inch that the barometer is above or below 30 inches. The correction for temperature is made by adding or subtracting one per cent. for each 5° F. the temperature is below or above 60° F. The following example shows the calculation:

43 min.....	6.407 meter.	Ther., 72° F.
49 min.....	6.916 meter.	Bar., 30.6.
6 min.....	.509 feet.	
12 min.....	1.018 feet.	
	.024 thermometer correction.	
	.994	
	.020 barometer correction.	
	1.014	

43 min. 17 sec.....	0 grs. candle.
48 min. 5 sec.....	10 grs. candle.
4 min. 48 sec.....	10 grs. candle.

Readings.

17.4 candles.	17.7 candles.	17.5 candles.
17.3 "	17.3 "	17.7 "
17.5 "	17.2 "	18.0 "
17.8 "	17.0 "	
17.9 "	17.1 "	17.49 candles (average).

17.49
.24 correction for rate = 1.4 per cent.—
17.25
.69 correction for candle = 4 per cent. +
17.94 corrected candle power.

The corrections are most conveniently made by percentage. If the gas had burned at the legal rate of 5 feet per hour it would have burned in 12 minutes 1 foot; 1.018 feet was burned. The temperature of this gas was 72° F., or, as gas expands about one per cent. of its volume for each 5° increase in temperature, it would occupy 2.4 per cent. less space at 60° F., the standard temperature. As the gas was measured under a pressure of 30.6 inches of mercury, a pressure two per cent. greater than the standard, which is 30 inches, and as the volume of any given quantity of gas is inversely as the pressure exerted on it, the observed volume should be increased two per cent. These corrections having been made it is found that 1.014 feet gas was burned, when only 1.000 foot should have been burned; therefore, 1.4 per cent. should be subtracted from the observed candle power.

The candle should have burned 10 grains in 5 minutes (300 seconds); it did burn 10 grains in 288 seconds, or 12 seconds less time than it should have taken. In other words, it burned four per cent. faster than it should, as each three seconds is one per cent. of the whole time. As the candle gave more light than it should, the four per cent. is to be added to the candle power. These corrections for rate of burning of both gas and candle are made on the supposition that the light produced is exactly proportioned to the amount of combustible burned.

If the gas has been burned at a rate much different from 5 feet per hour it is not sufficiently accurate to add or subtract from the result the percentage by which the rate varies from one foot in 12 minutes, but the observed candle power must be divided by the number indicating the corrected amount of gas burned in 12 minutes. In our example, if a rich gas had been tested which burned .600 foot in 12 minutes (3 feet per hour) instead of 1 foot, and the other observations had remained the same, we should find the candle power for 5 feet per hour by dividing 17.49 by .600 and obtain 29.15, and, adding the 4 per cent. correction for rate of burning of the candle, we should have 30.32 as the corrected candle power for 5 feet per hour.

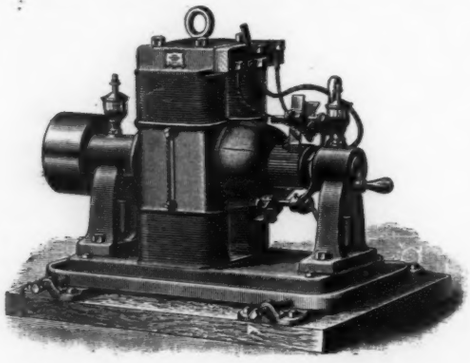
The Waterhouse Arc System.

Sometimes those who get in first are not the ones to be most congratulated, and the conservatism of gas companies stands them good at the present time. It can be said that arc lighting is to remain a reality in this country, and it is matter for congratulation that gas companies that have recently, or are about to add an arc lighting plant to their works are not loaded with apparatus which, having seen its best days and because of its ancientness, is now but fit to cast into the scrap heap. On the contrary, they are in position to appear as purchasers of that system which, from amongst the many offered, they consider the best. No one can gainsay the fact that, from the time such plants were put on the market, the amount of power necessary to maintain an arc light has been greatly reduced, and the lights are also now practically steady. In keeping with the advances made in respect of economy of power and evenness of light, the Waterhouse folks are quite abreast of the times. In fact, their Colt's West Armory Headquarters, in Hartford, Conn., show whether their wares are in demand or not; and the ayes have it pronouncedly.

Some months since we illustrated the larger dynamos and lamps turned out at the Waterhouse shops, and below we give an illustration of their small dynamo, intended to form part of the installation of a 3, 5, 10 or 12 arc light plant.

The details of this machine have been recently improved, and among the changes we note a new brush holder, slides with bolts for tightening belts, a groove at the outer edge of base for collecting any surplus oil (which would likely otherwise drop to and saturate the surrounding floor space), and a commutator made from Billings' drop-forged copper segments. The same method of regulation applies to the small dynamos as to the larger types of similar machines made by this Company; and the small plants have, therefore, the important feature of self regulation without the necessity of depending upon a mechanism to promote it.

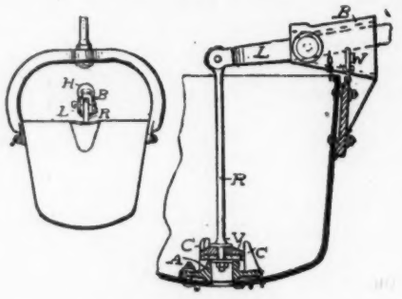
There are three circuits—one, from the armature, by way of the main brush, around the field magnets of the dynamo to the lamp line, called the field circuit, and the second circuit, by way of an auxiliary brush, passing outside of the machine to the lamp line, where the sum of the two currents forms the working circuit which passes to the lamps. In order to maintain a uniform light the amperes passing through the lamps must remain the same whether one lamp or the whole number are burning. To accomplish this there must be regulation. If a lamp is cut out



the current in all dynamos tends to increase, and without regulation it would build up and eventually destroy the entire apparatus. The result with the Waterhouse regulator, when lights are cut out, is to instantly reduce the current passing around the dynamo—which, of course, limits its generating capacity, and, at the same time, the local current increases in proportion to the decrease of the main current—the efore, on the working circuit or lamp line the standard current is maintained. It was this ingenious feature of self-regulation that led the Board of Governors of the Massachusetts Charitable Mechanics Association, of Boston, at their late exhibition, to award a gold medal to the Waterhouse system.

The Nicholson Lead Ladle.

Mr. H. Nicholson, England, has patented a ladle designed to assist the pipe jointer in the operation of feeding molten lead about the joints of pipes for the supply of gas and water. The cuts, which are taken from the *Engineer*, show pretty clearly the main features of Mr. Nicholson's device, who claims that its use will prevent the admission into the joint of scum or dross, to dispense with any necessity for skimming the lead, to be run without tilting the ladle, and to minimize the danger to the operatives. It has, further, for its object to enable the lead to be run simultaneously on both sides of the collar when making a joint with two spigot pipes and a collar. Fig. 1 presents a front view and Fig. 2 gives an enlarged section of the valve, rod and lever. These improvements



consist in attaching to the bottom of the ladle a raised valve *A*, within which is a conical or cylindrical hole for the exit of the metal. The plug or valve is constructed partly of fireclay, and is attached by means of a rod, *R*, to a lever, *L*, the fulcrum of which is mounted upon a bracket, *B*, secured to the rim of the ladle. This bracket has stops for limiting the amount of angular motion of the lever *L*, so as to prevent the valve or plug being lifted beyond the range of the guides *C*. To prevent the accidental escape of the molten lead by an accidental movement of the lever, between the lever, *L*, and the bracket, *B*, a key or wedge, *W*, is inserted, which is removed when the joint is to be run.

Has the St. Louis Gas, Fuel and Power Company Violated its Charter?

The following from the St. Louis *Globe-Democrat*, May 3d, explains itself:

Judge Valliant yesterday sustained a demurrer to the petition in the suit of the city of St. Louis vs. the St. Louis Gas, Fuel and Power Company. The ordinance granting a franchise to the St. Louis Gas, Fuel and Power Company contained a provision that the Company should not sell or transfer the privilege granted, or unite or pool its earnings with any other concern engaged in the manufacture and distribution of gas. It was also provided that if the Company failed to observe the terms and conditions previously named, the privileges granted by the ordinance should be declared forfeited. The Company having accepted the ordinance and not having abided by its conditions, the city authorities, by City Counselor Bell, commenced the pending suit to have the franchise of the Company declared forfeited, on the ground that the Company had united and pooled its earnings with the St. Louis Gas Company and the Carondelet Gas Company, and had transferred the privileges granted it to the St. Louis Gas Trust. The defendant filed a general demurrer to the petition, setting out that the petition stated no cause of action. The Judge sustains the demurrer on the general ground of the want of jurisdiction. In reviewing the subject the court states that the plaintiff encountered a difficulty on the very threshold of the court in the proposition that a court of equity would decree a forfeiture. The Supreme Court in the 22 Mo., 369, had said: "A court of equity never lends its aid to enforce forfeiture under any circumstances." This was a proposition in which all the authorities seemed to agree. The only case cited by counsel for the plaintiff as against it was Knight vs. Railroad Company, 70 Mo., 231, but that was not a suit in equity at all. In that case the city of St. Joseph had by ordinance granted to a railroad company the right to occupy and lay its tracks in a street of that city upon condition that the company would do certain acts; the company accepted the privilege so granted, laid its tracks in the street, and proceeded to use and occupy the same, but omitted to perform the conditions on which the privilege was granted. The plaintiff in that case being the owner of a lot abutting on the street, sued the railroad company for damages, as for an unlawful occupation of the street. The court held that whether there was a forfeiture or not by the railroad company was a matter between it and the city, but that the owner of the lot had no right, in the absence of any act of re-entry by the city, to assume or declare that the privilege was forfeited. The court there said that the failure to perform the conditions subsequent did not *ipso facto* work a forfeiture so as to give the owner of the abutting lot the right to maintain the suit. It might be stated as a general proposition that the mere failure

to perform a condition subsequent did not *ipso facto* work a forfeiture. In order to make the forfeiture complete the other party to the contract must re-enter or do some act of that nature appropriate to the estate or right in question. In the case of Railroad Company vs. Leavenworth, 1 Dil., 393, also cited by counsel for plaintiff, there had been a similar contract between the city of Leavenworth and the railroad company. The latter, after accepting the privilege granted by the city, took possession of the streets, laid its tracks through them, proceeded to exercise the privileges granted, but failed to perform the conditions prescribed in the grant, and thereupon the city of Leavenworth did not go into a court of equity and ask that the franchise be decreed forfeited, but proceeded to re-enter and take possession of its streets and tear up the tracks of the railroad company; the company filed a suit asking for an injunction, and the court held that the city had a right to do as it was doing, refusing an injunction. In the case at bar, if the defendant's conduct had been such as to entitle the city of St. Louis to treat the privilege granted to the defendant under the ordinance in question as forfeited, the city might re-enter on that part of its streets now occupied by the defendant, and prevent the further exercise of the license; but the city must first decide the question for itself and act upon it. There was no power in a court of equity in advance of a re entry to declare the franchise forfeited, or to aid in effecting a forfeiture. Where a party to the contract assumes that a right granted by it has been forfeited and acts upon that assumption the court could pass upon the validity of the act when brought into question, and could in that way pass upon the question of forfeiture as an accomplished fact, but it would not anticipate it.

Soon after the decision was rendered City Councilor Bell held a consultation with the Mayor and Street Commissioner Turner, in which he fully explained the status of the case and the relations between the city and the Water Gas Company. He said that under the decision the Company's charter was forfeited, and that the city could deprive them of the use of the streets occupied by their pipes. As a result of the consultation the City Councilor sent a communication to Messrs. Adams and Post, the attorneys of the Water Gas Company, notifying them that the city would proceed at 11 o'clock to-morrow to tear up the pipes at Eighteenth and Clark avenue, where the Company's works are located, to prevent them from delivering gas to their customers. The main pipes are under Clark avenue at Eighteenth street, and when taken up the Company will have to cease operations. The notice sent to the Company's counsel stated, further, that the pipes would be taken up without fail at that hour, unless the city was enjoined in the meantime from taking such action.

Speaking of the matter to a reporter, Mr. Bell said that he did not know what further steps the Company would take, if any; but the city would certainly take up the pipes Wednesday morning unless prevented by injunction. The city could not take possession of the works, because of the fact that they are on private property; but could take charge of the pipes, for the reason that they are on city property. He added that the Company could not have expected any other result when it violated the provisions of its franchise by consolidating and pooling with other companies, which is forbidden in the ordinance under which it has been operating. Up to a late hour yesterday afternoon the City Councilor had not heard what the Company proposed to do, but it is probable that they will make an effort to enjoin the city from carrying out its expressed intention.

Dwight Tredway, of the Gas, Fuel and Power Company, in speaking of the decision said: "By the present status of affairs the Gas Company will do nothing, but remain quiet to see what further action the city will take in the matter."

Judge Adams, attorney for the Water Gas Company, when asked what action the Company would take, replied: "We shall await the action taken by the city before we proceed further. The decision by Judge Valliant has thrown the case out of court, because the city did not furnish a sufficient number of facts as a ground for any suit. The Gas, Fuel and Power Company does not belong to the Gas Trust, but it is only a large number of stockholders who have placed their individual stock in the Trust. These stockholders have a right to do as they choose with their own stock in that regard, and no agreements in the Company's charter have been violated."

W. H. Thompson, President of the Gas Trust, was approached on the subject, and he replied: "The majority of the stockholders of the Gas, Fuel and Power Company have placed their stock in the Trust, and thereby I have the right to cast their votes, as a trustee, in the election of directors for the Gas Company. While the Gas Trust is not in the fight, the trial being solely between the City and the Gas, Fuel and Power Company, yet whenever the interests of the stockholders I represent are imperiled, then the Gas Trust will likely join in the fight against the city."

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

BRANCHING OUT.—Mr. Jason Giles, the efficient General Manager of the Chapman Valve Manufacturing Company, has completed arrangements under which the Company will hereafter have a branch office and salesroom in Chicago. The branch, which rejoices in the possession of handsome and commodious quarters at No. 24 West Lake street, is in charge of Mr. Edmund W. Buss.

AS was foreshadowed a fortnight ago in our "Market for Gas Securities," the stockholders of the competing Baltimore Gas Companies ratified, on Saturday, 5th inst., the merger proposition previously prepared for their acceptance or rejection by the Directors' Committee of the Consolidated, Chesapeake and Equitable Companies. The Chesapeake and Equitable shareholders were quite unanimous in their respective votes on the affirmative side of the proposition. In the first named Company 19,474 (out of a total of 21,041) shares were voted on, the Equitable vote being returned as 13,696 shares, out of a total of 15,500. The Chesapeake Company named Messrs. Wm. S. Carroll and D. D. Mallory, of Baltimore, and H. J. Davison, New York, as its representatives in the new Consolidated Company's Directorate, the Equitable representation thereon to be E. C. Benedict, New York, and W. F. Frick, Balt. The old Consolidated Company's meeting was not so harmonious as the other gatherings, but the opposition, although strong in voice, was weak in vote. Out of the 60,000 shares, 45,036 were voted on, of which all but 810 were in the affirmative. The Directorate representatives named were Messrs. H. Janes, J. A. Gary, W. B. Brooks, W. W. Spence, B. Kahn, W. F. Burns, and old reliable, Capt. John W. Hall. The capital stock of the new Company is $11,000,000; bonded debt, $6,400,000. The Board of Directors organized in the following way: President, Capt. J. W. Hall; Secretary, L. R. Smoot; Treasurer, Chas. F. Peregoy—who occupied similar positions in the old Consolidated Company. The only new face is that of W. S. Carroll, late of the Chesapeake Company, who was chosen Vice-President. This settlement of the Baltimore war is a virtual victory for Capt. Hall and the old Consolidated Company, who deserve much praise for their sturdy fight; but we are inclined to the view that the Chesapeake (or fifth wheel) Company speculators got a pretty good slice of the melon—even the rind would have been too great a feast wherewith to appease their appetites. We once more call the attention of the City Councils of Newark, N. J., Syracuse, N. Y., and Springfield, Mass., to the difference between the promises of Peter Simple, when on the outside but anxious to get in, and Sam Slick's performances (Simple's successor), once an entrance has been gained. Some, who pretend to be "in the know," say that other Peter Simples are thinking about trying it on again in the Monumental City, whereupon we are moved to exclaim, "Poor Baltimore!"

WITHIN the last month six deaths are reported to have been caused by electric light wires. Of these two happened in this city; two in Halifax, Nova Scotia; one in New Orleans, La.; and one in Lynn, Mass. This is rather startling testimony to the necessity of burying the wires, and also goes to show that plants of the electric type need frequent overhauling and the expenditure of much money to keep them in fair working order. Mr. Edison can vouch for this latter, for anyone who is often in the show district in this city of the Edison Company cannot fail to have noted the monotonous regularity with which the Edison underground conduits are operated upon in one way or another by the repair gangs. By-the-way, it is a fact that the Brush Company, of New York, passed its last quarterly dividend—8 per cent. per annum had been paid by it for two or three years—the ostensible reason for the "miss" being that reconstruction had absorbed a heavy sum during the quarter. The Brush Company here, it should be understood, operates in the very best paying arc lighting district in the world; and while we know that it is counted very old-fogeyish (at the present time) to hint that arc, or, for that matter, incandescent lighting, may not mean 20-odd carat fine profit for its suppliers, we nevertheless find it to be the fact that New York's speculators will not offer over 85 for Brush shares—and the Company is not over-capitalized, either; that is, if the word of its officers goes for truth.

STREET LIGHTING, MILWAUKEE, WIS.—The contract now existing between the city and the Milwaukee Gas Light Company, under which the latter maintains 2,566 public gas lamps, expires on July 1st; and the Company has signified its willingness to accept a new contract on the basis of $23 per lamp per annum, instead of the $30 rate now obtaining. This means a saving to the city of about $18,000, and is a very liberal proposition. The Badger Illuminating Company's proprietors are badgering the authorities for an extension of public favor—they now have

about 60 arcs, for each of which they receive $150 per annum—but, as the service has been of a go-as-you-please sort, it is not likely that any important addition will be made to it. The liberality of the $23 gas rate will be better understood when it is said that the public posts, lanterns, etc., are all owned by the Gas Company.

CHANGES.—May-day does not seem to have caused many of the metropolitan fraternity of gas engineers, contractors, etc., to take up their desks and move. So far, the only changes brought to our attention were the following: Mr. Wm. Mooney will hereafter be found at No. 94 Liberty street; Fred. Bredel removed from 332 E. 17th street to 208, same thoroughfare; and C. B. Orcutt, Gen'l Agent of the C. & O. Railroad Coal Agency, is installed in the magnificent Washington Building No. 1 Broadway. The Messrs. Connelly & Co., Limited, have closed their Pittsburgh offices.

THE Brooks Gas Process Company, of Pennsylvania, was incorporated at Camden on the 4th inst. The capital was fixed at $500,000, with, it is said, $100,000 paid up.

IT is said that Mr. Burnham, who has been a tower of strength in the East Boston Gas Company for many years, has resigned his position as Superintendent, and will remove with his family to Farmingdale, a very pretty suburb of Augusta, Me. We do not like to see such men as Mr. Burnham retiring from the active list.

HOW THEY SENT OFF MR. TODD.—To our prior announcement that Mr. J. R. Todd had resigned his berth with the Natick (Mass.) Company, in order to assume charge of the Middletown (N. Y.) Gas and Electric Light Company, we may add that his brother Odd Fellows of Natick treated him to a great surprise previous to his departure from them. The recipient, in company with 200 citizens of Natick, was invited to partake of a collation, spread out on tables in the new banquet hall of the Odd Fellows Building—it should be said that Mr. Todd is a Past Grand of the Natick Lodge. When the items of the repast had been put where they would do the most good, the reigning Noble Grand, Mr. Childs, said the gathering had been called to do honor to one of their most active members, who was soon to leave them for another field of usefulness. He paid a handsome tribute to the worth of their brother, which was reiterated in the sentiments of subsequent speakers. When the speechmaking was finished—by that time Brother Todd seemed a trifle confused—the Chairman advanced and presented the guest of the evening with an elegant jewel commemorative of his record as Past Master. When confronted by the indignant consumer, Brother Todd was never known to falter; but on this occasion his ready wit seemed to have deserted him. He, however, speedily rallied in graceful fashion, and his acknowledgement of the fraternal feeling so convincingly displayed brought to a happy termination an evening thoroughly enjoyed by those privileged to participate in its pleasures.

ON the 2d inst., the Board of Aldermen (Chelsea, Mass.) ordered the Lighting Committee to enter into a contract authorizing the Chelsea Gas Light Company to perform the public lighting for a period of 3 years.

THE Putnam (Conn.) Company's plant was badly damaged by fire on the night of April 27. A water gas apparatus had been installed and was being experimented with, and some sort of carelessness gave rise to the disaster. In fact, a Boston newspaper—the *Transcript*—calmly says that the fire resulted from the "act of an 'expert' who held a lighted match to one of the gauge glasses on the meter, to see how it stood," etc. We do not know what became of the "expert;" but we do know that his expertness cost the Putnam Gas Company—or, rather, some insurance company, for the plant was fully insured—about $2,500.

MR. J. P. SCOTT has sold a controlling interest in the Shreveport (La.) gas works to Messrs. W. E. Hamilton, of Shreveport, and J. R. Ryan, of Birmingham, Ala. Mr. Hamilton will hereafter act as manager. Considerable improvement will be made in the distributing plant, the generating department being now in pretty good shape, thanks to that new bench of 5's.

ANNUAL ELECTION, LAWRENCEBURG, IND.—At the annual meeting of the Lawrenceburg Gas Company the following Directors were chosen: Messrs. John, J. W., and T. W. Isherwood, and Warren Tebbs. The officers elected were: President and Treasurer, John Isherwood; Secretary, Omar T. Stockman; Supt., Jas. W. Isherwood. The Company was quite prosperous last year.

The City Council of Baltimore has passed an ordinance prohibiting the local gas company (it seems odd to use the singular in this connection) from allowing any drainage from its works to run into the city's sewers. The penalty for each offense is placed at $100.

THE writ of garnishment against the Gate City Gas Light Company (Atlanta, Ga.), in connection with W. E. Lawton and his claims, was argued in the local City Court on the morning of the 4th inst., and a verdict against the Company, in the sum of $71,000, was found. In effect this verdict is equivalent to a decision that the Company owes Lawton the sum named—a feeble ray of hope for Lawton's creditors.

IN our last we had occasion to say that Mr. R. A. Dittmar, of Troy, Ohio, was doing quite well in the matter of his recent gas purchase at Brownsville, Tenn. His success, however, is much greater than we supposed (which is just the sort of news that pleases us), as the following letter from him, forwarded under date of the 7th inst., proves: "*Mr. Editor*—Since meeting you in Sandusky I have spent most of my time in Brownsville, overhauling and putting the works in first-class running order. As I am in favor of cheap gas I have reduced the price from $3 to $2.50 per thousand cubic feet, and on April 29 the street lamps were lighted for the first time in 9 years. The citizens are quite jubilant over it, and many an encouraging remark was made. I feel very much encouraged by my success here—the consumption has almost doubled within the short time that I have owned the works—and the prospect for the future is of the most flattering nature." Mr. Dittmar has our congratulations; and there can be no doubt that he will be as successful in Brownsville, Tenn., as he was and is in Troy, Ohio.

PUBLIC LIGHTING, NEWBURGH, N. Y.—Manager E. H. Hasbrouck, who has been in charge of the Newburgh Electric Lighting Company since the failure of the Messrs. Wiltsie, made a proposition to the Common Council (at its first meeting this month) to light what is known as the "Newburgh Electric Light District," for 11 months from the 1st prox., with the same description of arc as was formerly in use, the price per arc to be $9.25 per month. The proposition was accepted. The cost of public electric lighting in the city for the year will be $10,212. At the same Council meeting President Adams, of the Consumers Gas Company, offered to keep up the lighting in the "Gas District" at the rate of $32 per annum—this sum to include lighting, extinguishing, and repairing. He also proposed to supply gas to public buildings, at the rate of $2.25 per thousand. Both propositions were accepted. The rates for lighting (both electric and gas) are the same as those which ruled during the past year.

SAN FRANCISCO LIGHTING DIVIDENDS.—During the month of April the following dividends were declared on the shares of lighting companies, either entirely or largely controlled by San Francisco capitalists:

Company.	Dividend in Cents per Share.	Amount.
Capital Gas Co	100	$10,000
Pacific Lighting Co	25	1,250
Oakland Gas Co	20	6,000
Pacific Gas Improvement Co	40	12,000
San Diego Gas and Electric Light Co.	25	1,250
San Francisco Gas Co	30	30,000
Stockton Gas Co	25	1,250
California Electric Light Co	20	10,000

This represents, as will be seen, a total disbursement for the month of $71,750, and an average rate of monthly dividend of 35½ cents per share. For the corresponding month in 1887 the average rate per share was considerably less than that reported for the current year.

A GOOD VETO MESSAGE.—Governor Buckner, of Kentucky, in returning unapproved to the Legislature of that State a bill entitled an "Act to incorporate the Citizens Gas Company of Paducah," gave the following excellent reasons for his dissent: "The incorporators are invested with full control of the Company, and may themselves make all bye-laws and regulations. While they have the power, they are not required to provide for the election of directors. There is no obligation to subscribe stock, and though large powers are given to disturb the property of others, they are not required to pay in a cent of their own money. There is no obligation to begin work at any time; nor is any limit fixed to the duration of the charter. They can hold it in perpetuity, or until a purchaser presents himself to buy the property of the people thus donated to these incorporators without consideration and without imposing upon them any obligation to discharge their duty to the public. It is probably to give greater value to the franchises in speculative mar-

kets that the 11th section provides that all acts or parts of acts in conflict herewith are repealed. As this provision may possibly affect enterprises of equal or greater merit, the repealing clause should be more explicit, lest, from its indefinite character, wrong be inflicted upon the community by destroying some enterprise that promises to be more useful to the public." The Paducah traffickers in gas charters can extract but slight nourishment from this decidedly vigorous comment of Kentucky's Chief Executive.

THE Gainesville (Ga.) Light Company was incorporated on the 4th inst., but organization has been deferred. Its promoters propose to operate a combined gas and electric lighting supply. Gainesville is the capital of Hall county, and is on the old Atlantic and Richmond Air Line Railroad at a point 53 miles northeast of Atlanta. Population, about 5,500.

WE have received a copy of a circular recently issued by Mr. Jacob G. Miner, of this city, whose Globe street lamps, in one shape or another, having been on the market for many years, still give great satisfaction to the gas companies of the country. The circular is mainly taken up by testimonials from well-known gas engineers who speak from experience, and whose every word can be taken for truth.

BROOKLYN, N. Y., was treated to a mammoth fire about a fortnight or so ago, which seemed so suspicious in its origin that Fire Marshal Lewis was instructed to make a searching investigation. The Marshal reports that an explosion preceded the flames, and he gives it as his opinion that the incendiary, having turned on (without igniting) two or three gas jets, placed a lighted candle on the floor, carefully closed the doors and departed. In due time the escaping gas descended to the candle; and the result is apparent.

XENIA, Ohio, despatches (dated May 4) brought the news that Mr. M. C. Allison (who is the principal owner of the Xenia Gas Light Companp) had made an assignment. Mr. Allison has been in ill-health for some time back. His many Ohio and Illinois friends will join with us in the hope that his embarrassment will be but temporary, and that renewed strength (both physical and financial) will speedily be granted him.

SOME months ago the Thomson-Houston folks determined that Medina, N. Y., ought to have arc lights on the streets, and that Medina's merchants would never be abreast of the times until their store fronts were adorned with Thomson-Houston lamps. Believing so, the benefactors put up a make-shift in the shape of a plant, and to convince the burghers of the efficacy of public arc lighting, supplied the authorities with a few arcs for which no charge was to be made "until they were satisfied," etc. In the meantime difficulty was experienced in disposing of stock, and the city fathers did not seem over-anxious to enter into a contract with the Company, the merchants also being dilatory in "taking the light." Of course, this was discouraging; whereupon patience ceasing to be a virtue, the Thomson-Houston folks packed their plant to other newer and greener fields—that is, all but the wires, which now act as supports for Chinese lanterns, the Medina youth being partial to evening displays of this description.

STREET LIGHTING, NEWPORT, R. I.—About a fortnight ago the report of the Committee on street lighting of the Newport Board of Aldermen was received. The report recommends that a contract be made with the Newport Incandescent Illuminating Company for 30-candle power incandescent electric lights, at the bid price of 6.7 cents per light per night, for a term of 18 months from the first Monday in July, the lights to be placed on the present gas and naphtha lamp posts. The lanterns on the old posts are to be removed, and the latter are to be lengthened by means of iron curved arms, and at the contractor's expense, to a uniform height of 16 feet. In the streets where arc lights are now used the Incandescent Company's posts are to be placed, and in these locations the incandescents are to be but 100 feet apart. It is estimated that a total of 775 lights will be required; which means the entire public street lighting of the city by incandescent lamps, or to the exclusion of both gas and arc lights. The report was tabled.

THE Bathurst district gasholder now being erected by the Consumers Gas Company, of Toronto, Canada (Messrs. C. & W. Walker having the work in charge), is of the telescopic, non-trussed order. It is in two lifts (150 feet in diameter by 35 feet in section), and has 16 steel columns. The tank work complete involved an expenditure of about $75,000; Messrs. Smith & Riley, of St. Catherines, having attended to the mason work. It is thought the vessel will be completed in October. Next year the Consumers Company will in all likelihood erect another large holder in the northwestern part of the city.

RESPONDING TO DIRECTOR WAGNER'S INVITATION.—In accordance with the tenor of the invitation, Director Wagner opened (on May 8) the bids which had been submitted for the purchase of coal tar and spent lime produced in the Philadelphia municipal gas works. The bidders for the coal tar were: M. Ehret & Co., who offered 20 cents per ton of coal carbonized, on the basis of a yearly contract. If a 3-year contract was granted, the rate to be increased to 21½ cents. Joseph W. Stellwagen's Sons offered to pay 26½ cents per ton of coal carbonized, on the basis of a 3 year contract. Chas. B. Houseman was the only bidder for the foul lime. He offered the following, the contract to stand for one year: Ninth Ward works, $10; Twenty-fifth Ward works, $20; Twenty-sixth Ward, $20; Twenty-first Ward, $5; or a total of $55. The price received this year was $50. The bids were held under advisement.

DECATUR, Alabama—188 miles east-by-south from Memphis, and 123 miles south of Nashville—is to have a gas works. Eastern capital is anxious to undertake the venture.

THE office of the Omaha (Neb.) Gas Company has been removed from its former ancient and honorable location in the rear of the Merchants' National Bank to the basement of the new bank structure on 13th street. The new quarters are handsomely furnished in solid oak and beveled plate glass; and a "complaint desk" has been added to the departmental features. Pity the party who poses behind it.

THE Westinghouse electric lighting plant of the New Bedford (Mass.) Gas Light Company was started up Saturday week. Mr. Taber says he is quite satisfied with it.

THE El Paso (Texas) Gas, Coal and Coke Company has determined to engage in the supply of electric light.

THE Massachusetts Board of Gas Commissioners is to try its capacity once more in acting as an arbiter between the sellers and purchasers of gas. This time the scene of operation is to be laid in Roxbury, F. Ferdinand and other citizens of what was once known as Boston Highlands having petitioned the Commissioners to inquire into the necessity of ordering a reduction in gas rates. The ordinary current rate in Roxbury is $1.75 per M. Those who use over $500 worth of gas per annum are entitled to a discount of 5 per cent.

THE Beverly (Mass.) Gas Light Company has petitioned the Gas Commission for authority to supply electric light and power.

DALTON (Ga.) is to have a gas works, the Council recently having granted a franchise to a party of capitalists, who bound themselves to invest $25,000 in the enterprise, the works to be completed on or before November first.

SUPT. TRACY keeps hammering away at the authorities of Peru, Ind. His Company now offers to light the city for one year under the following conditions: 125 gas posts at $22 each; or 60 posts at $30 each; or 20 arc lights and 75 gas posts, at $3,600; or 25 arcs and 60 gas posts, at $3,600. They can take their choice.

CHANGES AT ATTLEBORO', MASS.—At a meeting of the Attleboro' Gas Company, held on the 2d inst., Jno. R. Bronson was chosen President, and Mr. Everett S. Horton Vice-President, to fill vacancies caused by the resignations of Messrs. J. W. Capron and George Crandall, who had disposed of their holdings in the Company. The Board of Directors, as reorganized, is as follows: A. A. Sturdy (who is also Treasurer and Secretary), W. M. Fisher, Shepard Carpenter, G. A. Dean and E. S. Capron.

LEONARD (Texas) is to have a gas company. Its President is Mr. Chas. Cund.

THE Petersburg (Va.) *Index-Appeal* says that the Petersburg Fuel, Gas and Power Company has purchased a plot of ground on Bolingbroke street whereon to erect a gas works. It then remarks that Mr. A. Langstaff Johnston, the Company's engineer, will at once—as soon as some minor details, etc., have been attended to—"commence the work of construction, which is to be pushed vigorously forward." We wonder if some of the "minor details" could possibly include a "delicate negotiation" with the owners of the existing Company! Of course, Mr. A. Langstaff Johnston's employers are in the field simply for the good of the gas consumers of Petersburg; but we are afraid that the old Com-

pany's bank account has some attraction for them, too. There is not room enough in Petersburg for two gas companies, and Mr. A. Langstaff Johnston's backers will eventually discover this interesting fact—and they will not get any part of that bank account, either.

The Huntington (West Va.) Fuel, Power and Light Company has been incorporated, with a capital of $100,000. Huntington is in Cabell county, and is on the Ohio river just below where the Guyandotte enters the latter. It is 20 miles above Ironton, Ohio, and is the Western terminus of the Chesapeake and Ohio Railroad.

Supt. Prichard, of the Lynn (Mass.) Gas Company, has been unusually busy of late; but one result of his labor will be that all the people of Swampscott will soon be able to have a plentiful supply of gas. The main pipes are now being buried.

Macon (Ga.) Gas Matters.—One of those who was greatly missed at the Chicago "Camp" of the Western Association was the lively representative from Macon, Ga., whose cheery greeting is ever of the cordial sort. However, to show that there was good and sufficient reason for his absence we append the following notice, taken from a local paper: "In consideration of the fact that the Macon Gas Light and Water Company has purchased the latest and most improved machinery for making water gas, notice is hereby given that after July 1st the price of gas to all consumers will be reduced to $1.50 per thousand cubic feet. This is cheaper than kerosene oil. As there has been, for nearly a year past, considerable talk of another gas works being built, it becomes necessary to notify our consumers that we intend to protect them, and that where any competing company is prepared to deliver them gas, the price to them from this Company will be $1 per thousand. The mains will be extended to all parts of the city where a number of consumers sufficient to make it at all remunerative can be obtained.—A. E. Boardman, Supt." That $1.50 rate is a tempting one, and many a consumer will doubtless thereby be lured on to have his name spread upon the Company's ledgers; but it is not a "faithless phantom" that will have acted as the magnet. In view of the above, we suppose Bro. Boardman must have "excused" written down after his name in Secretary Littleton's roster of those present and absent at the Chicago gathering. We might also note that the authorities of Macon have made a contract with the water section of the Boardman Company whereby the dust in the streets is to be laid low. This is in the line of progress; although it does seem a trifle odd that the very best quality of potable water in the State of Georgia is to be devoted to such a base use. Still, there is plenty of it.

The reference in the Boardman notice to the seeming possibility of competition in the gas supply of Macon we presume hinges on the revivification or galvanizing of the charter granted, if memory serves us right, to the party named Starr, the memory of whom is an unpleasant dream to the residents of Belvidere, N. J. After his fiasco at this point, we thought it quite unlikely he could command sufficient confidence anywhere to enlist capital. At any rate, we made inquiry about this opposition movement at Macon, and were surprised to learn that practical progress was being made in it. It seems that a site has been secured for the works at the foot of Spring street, and that the buildings were already well underway; Mr. F. E. Babbit being the Superintendent in charge. It was expected that pipe-laying would be instituted toward the close of this month. Our informant naively adds that gas would be distributed, in the *business portion of the city*, on or about the 1st of August. Here we have the usual wretched method of attack. We cannot understand why City Councils in general can be persuaded to sanction such atrocious attacks on invested capital; and we are utterly at sea to comprehend why the Macon Council in particular should deal such a treacherous blow at those who, as Mr. Boardman and his associates did at a time when Macon's future prosperity was more than problematical, risked much in investing good hard cash with the understanding that Macon's corporate honor was pledged to protect them, provided they only kept their portion of the agreement by dealing fairly with the people in respect of the charges they would make for the service which they proposed to render. If the Boardman regime had been derelict in its treatment of the citizens, punishment could not be objected to, because it had been courted; but the records show that instead of demanding the pound of flesh to which they were entitled they were satisfied with far less! And this is their reward. We incline to the view, however, that when the future cost shall have been counted up, the corporation of Macon will not be the only sufferer—it will have company in the shape of a disgruntled set of speculators. What was done in Atlanta can be easily repeated in Macon.

The Minden Gas Light Company has absorbed the Fort Plain (N. Y.) Electric Light Company.

The Gas Commission of Massachusetts will, on the 22d inst., consider the application of Frank Ferdinand and others, for a reduction of gas rates in the Roxbury (Mass.) district.

[Official Report.]

Eleventh Annual Meeting of the Western Gas Association.

Held at Chicago, Ills., May 9, 10, and 11, 1888.

First Day—Morning Session.—May 9.

Kinsley's hall, within easy distance of the Grand Pacific Hotel, the headquarters of the Association, presented an animated appearance when, at 10:30 A.M. of May 9, the President, Mr. Emerson McMillin, of Columbus, Ohio, called the Western Gas Association formally to order for the opening session of the Eleventh Annual Meeting. No time was lost in the preliminaries, for almost with the fall of the gavel Secretary Littleton, in his accustomed brisk, business method, proceeded with the

ROLL CALL.

The responding members were:

Honorary Members.

Harbison, J. P., Hartford, Conn.
Humphreys, C. J. R., Lawrence, Mass.
Thomas, J. R., New York city.
White, W. Henry, New York city.

Active Members.

Ambrose, J. S., Springfield, Mo.
Baxter, Jr., A. C., Lima, Ohio.
Bixby, W. A., Galena, Ills.
Brown, E. L., Chicago, Ills.
Burns, G. B., Winfield, Kan.
Butterworth, C. W., Ft. Smith, Ark.
Canby, R. H., Bellefontaine, O.
Chollar, B. E., Topeka, Kan.
Clark, Walton, Kansas City, Mo.
Clarke, H. E., Kansas City, Mo.
Collins, C., Green Bay, Wis.
Coverdale, R. T., Cincinnati, O.
Cowdery, E. G., Milwaukee, Wis.
Critchlow, J. M., Beaver Falls, Pa.
Davis, D., Iowa City, Ia.
Diall, M. N., Terre Haute, Ind.
Dunbar, J. W., New Albany, Ind.
Egner, Frederic, St. Louis, Mo.
Elbert, V. L., Minneapolis, Minn.
Faben, Jr., C. R., Toledo, O.
Gerould, H. T., Mendota, Ills.
Gimper, J., Leavenworth, Kan.
Henning, D., Chicago, Ills.
Howard, J. B., Dubuqe, Ia.
Howden, J. J., Muskegon, Mich.
Hyde, Jr., G. A., E. Saginaw, Mich.
Jenkins, E. H., Columbus, Ga.
Keller, C. M., Columbus, Ind.
Kelly, R. W., Atchison, Kan.
Kellogg, L. L., Sioux City, Ia.
Kennedy, J. M., Rockford, Ills.
King, E. J., Jacksonville, Ills.
Knight, C. S., Fort Wayne, Ind.
Lansden, T. G., Washington, D. C.
Leefers, J. H., Shelbyville, Ind.
Light, Jos., Dayton, O.
Lindsley, Edw., Cleveland, O.
Littleton, A. W., Quincy, Ills.
McKnight, G. F., Englewood, Ills.
McMillan, Geo., La Crosse, Wis.
McMillin, E., Columbus, O.
McMillin, F. E., Neb. City, Neb.
Merrill, H., Janesville, Wis.
Mitchell, J. K., Galesburg, Ill.
Moran, M., Joliet, Ills.
Montgomery, Jas., Sedalia, Mo.
Morgans, W. H., Pontiac, Mich.
Morse, E. W., Fort Scott, Kan.
Murdock, G. T., Elkhart, Ind.
Murdock, J. W., Huntsville, Ala.
Murphy, J. M., Chicago, Ills.
Odiorne, W. H., Springfield, Ills.
Page, G. S., New York City.
Pratt, Henry, Chicago, Ill.
Prichitt, Samuel, Nashville, Tenn.
Ramsdell, Geo. G., Vincennes, Ind.
Reynolds, B. S., Louisiana, Mo.
Rice, E. S., Logansport, Ind.
Runner, Z. T. F., Freeport. Ills.
Schuster, P. F., Rockford, Ills.
Scofield, L. K., Fort Scott, Kan.
Shores, L. W., Kankakee, Ills.
Shreve, C. D., Marshalltown, Ia.
Smith, Thos., Grand Rapids, Mich.
Spencer, R., Burlington, Ia.
Starr, E. M., Richmond, Ind.
Starr, J. M., Richmond, Ind.
Steinwedell, Wm., Quincy, Ills.
Stratton, J. W., Valparaiso, Ind.
Tayler, Geo. H., Warren, O.
Thompson, J. D., St. Louis, Mo.
Tracy, Wm., Peru, Ind.
Wallace, Wm., Lafayette, Ind.
Walsh, R. D., St. Louis, Mo.
Wirt, R. D., Independence, Mo.
Woodmansee, J. H., Danville, Ill.
Woodmansee, R., Davenport, Ia.

Associate Members.

Adams, C. F., Chicago, Ills.
Babcock, H. C., St. Louis, Mo.
Bradley, C. D., Chicago, Ills.
Connelly, T. E., New York city.
Cressler, A. D., Fort Wayne, Ind.
Daniels, Jas., St. Louis, Mo.
Dell, John, St. Louis, Mo.
Down, W. H., New York city.
Goodwin, W. W., Phila., Pa.
Graeff, Jr., G. W., Phila., Pa.
Griffin, J. J., Phila., Pa.
Harper, H. D., Chicago, Ills.
Harris, Jos. A., Phila., Pa.
Hauk, C. D., Chicago, Ills.
Hicks, Geo. C., Chicago., Ills.
Hopper, W. H., Phila., Pa.
Howard, E. T., St. Louis, Mo.
Howell, W. S., Cincinnati, O.
McClary, N. A., Chicago., Ills.
McDonald, Wm., Albany, N. Y.
McIlhenny, John, Phila., Pa.
Merrick, S. V., Phila., Pa.
Persons, F. R., Chicago, Ills.
Powell, A. W., St. Louis, Mo.
Prentice, A. T., Chicago, Ills.
Ranshaw, H., Cincinnati, O.

Ransom, N. A., Chicago, Ills.
Rappleye, N. B., Chicago, Ills.
Roots, D. T., Connersville, Ind.
Russell, D. R., St. Louis, Mo.
Russell, T. G., St. Louis, Mo.
Sisson, F. N., Columbus, O.
Smallwood, J. B., Baltimore, Md.
Stacey, Wm., Cincinnati, O.
Stein, E., Phila., Pa.
Stout, John, Chicago, Ills.
Stratton, S. S., Chicago, Ills.
Twining, E. H. B., Chicago, Ills.
Walker, Jr., J. H., Pittsburgh, Pa.
Wolfe, L. J., Chicago, Ills.

The minutes of the 10th annual meeting were not read, the JOURNAL's report of the same being, on motion, approved.

APPLICATIONS FOR AND ELECTION TO MEMBERSHIP.

The President named Messrs. J. B. Howard, J. S. Ambrose, A. C. Baxter, Jr., R. H. Canby, and V. L. Elbert a Committee to examine and report upon applications for membership. The Committee subsequently reported in favor of the gentlemen whose names are appended—all of whom were, in due form, elected to membership:

Honorary Member.

Prof. T. C. Mendenhall.

Active Members.

Arndt, A., Chicago, Ills.
Bedard, T. W., La Salle, Ills.
Bolcom, H. C., Winona, Minn.
Bierce, F., Memphis, Tenn.
Cosgrove, W. L., Evanston, Ills.
Crowell, F. B., Burlington, Ia.
Crawl, J., Detroit, Mich.
Dunlap, F. M., Detroit, Mich.
Denniston, W. H., Pittsburgh, Pa.
Douglas, Sam'l T., Detroit, Mich.
Duncan, N. W., La Salle, Ills.
Eaton, W. M., Jackson, Mich.
Eaton, T. A., Jr., Detroit, Mich.
Freese, F. W., La Porte, Ind.
Forstall, Theo., Chicago, Ills.
Forstall, A. E., Chicago, Ills.
Gwynn, J., Fostoria, O.
Hyde, H. H., Michigan City, Ind.
Jones, C. D., Fremont, Neb.
Johnston, W. J., Fort Smith, Ark.
Light, G., Dayton, Ohio.
Mandeville, W. H., Lima, Ohio.
McKay, Chas., Watertown, Wis.
Perkins, N. C., Ottawa, Ills.
Pratt, E. G., Des Moines, Ia.
Roys, C. D., Elkhart, Ind.
Robinson, C. W., Meridian, Miss.
Ridgely, W., Springfield, Ills.
Raymond, H. S., Galena, Ills.
Stratton, R. J., Decatur, Ills.
Thompson, G. T., St. Louis, Mo.
Taylor, J. B., St. Louis, Mo.
Winegar, W. J., Palatka, Fla.
Whipple, H. S., Elgin, Ills.
Zimmermann, W. F., Pittsburgh, Pa.
Zion, C. M., Lebanon, Ind.

Associate Members.

Conover, S. D., Dayton, Ohio.
Fieldhouse, J., Jr., Chicago, Ills.
Guldlin, O. N., Fort Wayne, Ind.
Hogle, M. H., Chicago, Ills.
Jacobson, C. F., N. Y. city.
Loomis, B., Hartford, Conn.
McKeeby, S., Chicago, Ills.
Pollock, E. B., Chicago, Ills.
Reed, Wilmer, Burlington, N. J.
Russell, E. M., St. Louis, Mo.
Smith, A. N., Cincinnati, O.
Van Wie, P. G., Cleveland, Ohio.
Weaver, H. E., Chicago, Ills.
Wheeler, J. N., Chicago, Ills.
Webster, H., Chicago, Ills.

PRESIDENT'S ADDRESS.

The President then read the following address:

Gentlemen:—Another year, with its successes and failures, its prosperity and adversity, its pleasures and disappointments, has been checked off Time's calendar since we last met in convention to discuss questions of interest pertaining to our calling—questions the solution of which is supposed to inure to the mutual benefit of ourselves, our employers, and our employers' patrons.

The year has been one of great activity and agitation. While there have been no brilliant feats accomplished, no marvelous inventions successfully introduced, there has been an almost universal advance all along the line.

Gas managers' views have been broadened; the policy of gas companies generally has been liberalized. Other modes of lighting have made rapid strides toward commercial success, and are growing rapidly in popularity. Other fields for the use of gas have been exploited, with fair prospects of being eventually utilized. On the whole, it may safely be said that the future of the gas business is brighter to-day than it was a year ago; brighter to-day, in fact, than at any time since Murdoch lighted the Soho Works.

In keeping with the general outlook of our business is the outlook for our present meeting. All indications point to a successful convention. Our list of promised papers presents an array of authors equal to any that has been presented to this Association. The list, as published by the Secretary, is headed by a gentleman who never talks without imparting information. The subject, "Fuel Gas," is probably more discussed by the people and by the public press to-day than any question connected in any way with the business of gas making. It is the topic of the hour. Probably no gas engineer in the country is better able to present the subject to this convention than is Mr. Walton Clark.

"Half-Depth Regenerative Furnaces" is still a very live question. Probably a majority of the gas works of America are still struggling along with the old style of shallow furnace, with its concomitant of wasteful expenditure of fuel. Mr. Frank Bierce, of Memphis, Tenn., is prepared to discuss this question from an experimental standpoint. He will not only interest, but he will instruct the members of the convention. He will not only tell you what *he* knows, but he will manage, before the discussion ceases, to bring out the knowledge possessed by others of the convention on that subject.

"Inclined Retorts" is an entirely new subject for discussion in our Association, and will be presented by a gentleman who it is understood has made some careful experiments. Mr. Henry Pratt will no doubt present the question in such a forcible manner that we will all be *inclined* to accept his views, whatever they may be.

One question of transcendent importance (to consumers) has been shunned heretofore in our meetings. Your committee appointed to assign papers found an honored member with courage enough to undertake the task of discussing the dreaded subject, "Gas Company Accounts." Mr. J. D. Thompson is a born Abacist, and after you have heard his production you will know more about keeping accounts than you did when you left your homes.

"The Cost of Arc Lighting" is a question that probably every member has pondered over and figured on—a question about which we have all heard statements of the most contradictory character. Mr. C. M. Keller will give us facts from his experience book that will doubtless be of value to all.

"The Maximum Service that Should be Required from the Various Standard Sizes of Meters" will be elucidated by Mr. Wm. McDonald, a gentleman of large experience both in the manufacture and use of meters. With many companies the smaller sizes of meters are being discarded. This tends to an increase of invested capital. Whether or not the increased expenditure is warranted, will doubtless appear clear to our minds after we have heard the paper.

"Purification in Closed Vessels" is about as much discussed in England as fuel gas is in the United States. So far, however, the question seems to have been given but little attention in this country. We are fortunate in having the subject presented to our Association by one whose scientific attainments eminently qualify him to discuss the question. Mr. Frederic Egner is always listened to with pleasure.

There has been an underground current of excitement during the past year respecting "Incandescent Gas Lighting." The fact that, as a rule, it has not been possible for engineers to obtain the various forms of incandescent burners has tended to excite without gratifying our curiosity. How much information the author of the paper has been able to gather up I cannot even surmise; but we can rest assured that whatever facts were obtainable have been procured, and will be presented to the Association in the usual eloquent style of Mr. Edward Lindsley.

If the Association must grapple with "A Paradoxical Box," or any other paradoxical question, we are decidedly fortunate in having a man of Mr. B. E. Chollar's attainments to assist us in unraveling the mysteries of the laws of nature, and, especially in this instance, of pneumatics and gravitation.

Last in the published list comes the cosmopolitan Mr. George Shepard Page, with his ringing eloquence. When the field has been garnered by others he comes forth as a gleaner, and gathers up the residuals. If there is anything you want to know that he should fail to mention, ask for it. He roams with a free lance on this occasion; and if there should be a man in the audience who doubts the correctness of a gas meter, a man who would dare to question the great value of coal gas residuals, or a man who would advocate the use of gas containing more than 50 per cent. of carbonic oxide, that man had probably best not make his presence known.

We will have with us on this occasion a gentleman of international fame as a scientist, Prof. T. C. Mendenhall, who will, during the session, give us a talk on "Photometric Standards and Processes." He could not have selected a subject of greater interest. Those who were fortunate enough to have heard Prof. Mendenhall on other occasions can anticipate a profitable and enjoyable talk; those who have not heard him will fully realize after the lecture that their photometric education had previously been somewhat neglected.

Having hastily referred to the many interesting phases of our business that will be discussed at this meeting, it may be well to dwell a little more at length upon some of the questions of general interest.

That we might form correct conclusions respecting the present status of the lighting business, a series of questions were sent to more than 200

of the representative companies in the United States and Canada. In this connection it is with regret I mention the fact that less than three-fifths of the companies to which the questions were sent responded, notwithstanding the fact that a stamped envelope with printed address was inclosed to all. Those, however, who did respond are representative companies, and from their returns it is believed that fairly correct conclusions can be drawn respecting the business in general.

The output of the responding companies for the last year equaled about 12,000,000,000 cubic feet. Companies making probably 15 per cent. of the total quantity failed to state whether there had been an increase or a decrease in their output as compared with the previous year. Companies representing about 5 per cent. of the output reported an average loss of about 3.5 per cent. The remaining 80 per cent. reported an average gain of about 8 per cent., aggregating more than 800,000,000 cubic feet.

About 22 per cent. in number of the companies reporting are operating arc electric plants, and are supplying 2,450 lights. Fourteen per cent. of the companies are furnishing incandescent electric lights. Many of them report that they are just starting into this branch of the business. About 12,000 lights are now being supplied by these companies.

About 75 per cent. of the companies have arc lights in competition—that is, lights supplied by other companies. These companies are reported as supplying over 20,000 arc lights. Sixty-two per cent. of the companies have incandescent electric lights to compete with. The answers respecting the number of these lights were rather indefinite, as a rule, but show more than 80,000 lights in use, and probably 100,000 in use now and about to be put into use. But few companies responded to the question as to whether the number of electric lights was on the increase, but those who did respond generally showed a marked increase over the previous year.

Probably 20 per cent. failed to say whether there were gas stoves in use in their city or district; but, in most instances, it is fair to presume that there were a great many such. But one company, I think, reported no stoves. More than 30,000 stoves were reported in use. Estimating by the size of the cities failing to report, I would place the number of stoves in these at about 20,000; making a total of 50,000 in use by the 115 companies reporting. Some 73 per cent. of the companies reported the use of gas stoves on the increase; 20 per cent. reported no increase; the others failing to report.

In response to the question whether electric motors had displaced gas engines, 82 per cent. report "no;" 6 per cent. "yes;" the others not reporting.

"Is the gas engine trade on the increase?" was responded to in the affirmative by 41 per cent., and negatively by 50 per cent.; the others failing to respond. Almost every company reports the streets of its city lighted by gas *and* electricity.

The question, "Do you believe gas companies should do electric lighting?" was responded to in the affirmative by 44 per cent.; "yes," with provisos, by 15 per cent.; undecided, by 15 per cent.; positively "no," by 12 per cent.; the others failing to reply.

Twenty-seven per cent. report a reduction in price since last June. One reports an increase of price; the others report no change, or do not respond.

What conclusions may we draw from these reports? The first deduction is that of the great indifference of many officers of gas companies to answering such inquiries as are here referred to and as are often sent out. As a rule, the party declining or neglecting to respond is quite as much interested, and will be as much benefited by the knowledge that can be gathered from the compilation of such statistics, as is, or will be, the party or company who goes to the expense and trouble of making the compilation. Compilers of directories have experienced serious trouble in obtaining even the names of officers of gas companies, and answers to other queries, the responses to which would be either useful or convenient to us all, and the publication of which can injure no one. In the circular sent out recently for your benefit were questions to which there might be valid reasons for not answering, in the case of many companies; but there were other questions to which any company could respond.

Let us all contribute our mite to the dissemination of useful information—facts that will post us as to the *present* condition of business. The prosperity of the *past* will not pay dividends in the future.

Our second deduction is that, notwithstanding the great growth of other modes of lighting, the sales of gas show a very healthy increase—an increase as a whole probably equal to that of previous years. The reported gains over the preceding year range from 1 per cent. to 47½ per cent.

Third; that while the gas business is prosperous, more than one-fourth of all the companies have reduced the price of gas during the last nine months. Reduction in price and increase of business, now as in the past, go hand in hand.

Fourth; that the consumption by gas stoves is a valuable auxiliary to the consumption for illumination. The great number of stoves in use is a surprising feature of the statistics. Many companies can no doubt very materially increase their business by encouraging the use of stoves. Cooking stoves use gas at the very time when it best suits you to furnish it—during daylight, and largely in the summer season. Seventy-three per cent. of the companies report the trade on the increase.

Fifth; that the gas engine is probably holding its own against the use of the electric motor; the latter the more convenient, the former the more economical to operate. There is evidently to be a struggle for supremacy between these rival motors. The struggle will result in discarding small steam engines.

Sixth; that the sentiment respecting the advisability of gas companies doing electric lighting has undergone a wonderful change during the last year or two. More than one-fourth of the responding companies are *doing* electric lighting, and more than half *believe* that gas companies should do electric lighting.

Seventh; that both the arc and incandescent systems of electric lighting are growing rapidly. But few cities or towns are now without arc lights in the streets. While it is as yet far from being the most economical mode of lighting, it is rapidly supplanting other modes in the denser parts of cities and towns, and the time is coming when the public will demand arc or other powerful lights on most of the public streets.

Incandescent lighting is making equal progress with the arc lighting. It is the most convenient, the most cleanly, and the least objectionable, from a sanitary point, of any light now in use. Its convenience is making it popular. It will not do for gas managers to longer expect to fight it off by proclaiming its unreliability.(?) It is more reliable to-day than gas is during periods of low temperatures. Its service pipes do not freeze up. The danger of an entire district being left in darkness by an accident is greater with electricity than with gas. However such danger is remote with a well constructed electric light plant, and almost unheard of with gas. But little consolation can be drawn by the gas man from the knowledge of the fact that the incandescent electric light cannot be *manufactured* so cheaply per unit of light as can gas, when he further considers that whether it can be or cannot be, the fact remains that the light is being *sold* at prices sufficiently low to cause thousands and hundreds of thousands of the incandescent loops to be substituted for gas lights.

Let us not lag behind, but keep abreast of the demands of the times, and be prepared to recognize and supply the legitimate and reasonable demands of the public for whatever commodity their fancy may call for. It is not the province of the manufacturer to dictate, but for the purchaser to choose what light he will use. That gas will remain the light of the future for the masses there can at present be no doubt.

There is a pressing demand now, as there has ever been since the introduction of gas lighting, for cheaper gas. Apparently the public will never cease to believe that all gas companies charge too high a price for gas. This opinion is asserted quite as freely where gas is sold for $1 per thousand feet as where $4 is charged for the same quantity. Gas companies do not get credit for having reduced the price of their product far more than almost any other commodity has been reduced during the last decade.

Could the public only be induced to compare the treatment of consumers by gas companies with the treatment of the same consumers by water works authorities, the contrast would be greatly to the credit of gas companies. But few companies are now charging more than half, and in sores of instances not more than one-third, the price charged 15 years ago. Prices for water have been reduced comparatively little during the same period. Ninety or more per cent. of the gas works in this country are owned by individuals or private corporations, and are operated solely for profit; while 75 per cent. of the water works of the country are owned and operated by the public for their own convenience. As a rule, gas is paid for when consumed, while water must, as a rule, be paid for about six months in advance.

But the fact that we have treated and are now treating the public with more liberality than they treat themselves does not excuse us from the duty of a constant effort to give our patrons, if possible, a better service; and that, too, for less money.

While improved apparatus and improved modes of manipulation have, of course, contributed greatly toward a possible reduction in selling price, still the great factor has been *increased consumption*. This fact is forcibly impressed upon us when we compare the cost of distribution in summer with the cost of distribution in winter. The former is usually about double the latter. This being true, it follows that if we can, by

the introduction of gas stoves (which at present prices of gas will be used chiefly in the summer months), double our summer consumption, we can make material reductions in our selling prices.

It now appears, however, that the time is near at hand when it will be possible for us to increase our annual sales enormously—say, anywhere from 100 to 1,000 per cent. Such an enormous increase, of course, can only be brought about by furnishing gas that can be sold cheap enough to be generally used for fuel.

That illuminating gas can ever be sold cheap enough to warrant its general use for heating purposes can hardly be expected; but if the incandescent gas burners that are now pressing for recognition prove to be what their advocates claim them to be, then we may make non luminous gas that can be sold at a very low price.

Fuel gas is desired by the public. In fact, it is *demanded* by the public, and gas companies must supply the demand. Gas engineers say it can and will be made, but with the assertion our interest in the question apparently ceases.

The venture at Troy (N. Y.) proved disastrous. The effort at Lynn (Mass.) cannot be rated a success. The recent effort at Los Angeles is said to be giving satisfaction. But Los Angeles is so remote that it is not convenient for most members of this Society to make such investigation as would warrant them in either condemning or indorsing the system. Who will be the Moses to lead off in an effort to revolutionize the gas industry? All honor will be due to the gas company that shall have the courage to make the effort; and all honor will be due the engineer who makes the effort succeed. For a time he may be styled an enthusiast, or possibly be dubbed a crank. Laws of physic and chemistry will be quoted to show that his efforts cannot succeed. Some, however, I affirm, will have the courage to brave accepted authorities, and struggle for improved methods, if not hidden secrets.

"The acceptance," says Prof. Tyndall, "of mere authority in science leads to intellectual death." Fortunately, however, the accepted laws of physics and chemistry point to the possibility of a commercial success in the manufacture of fuel gas. In converting solid fuel to gas we know that there need not be a greater loss than about 33 per cent. of the energy of the coal. Then, after another loss of 17 per cent. of the energy of the coal, or 25 per cent. of the energy of the gas, in the combustion of the gas, we have for utilization 50 per cent. of the energy of the coal from which the gas was made. When we consider that in many instances not more than 5 per cent., generally not more than 10 per cent., and seldom (if ever) more than 25 per cent. of the value of solid fuel can be utilized in domestic use, do we not find a sufficiently large margin on which to base profits? This is taking no account of *convenience* and *cleanliness;* but these items will cut a large figure? In cities supplied with natural gas savings like this are claimed: A small family in very moderate circumstances is compelled, when using coal, to keep one servant; now, by using gas, the labor of building several fires, feeding the same—by carrying coal possibly up two or three flights of stairs—the removal of ashes and the resulting dust, are obviated, and the servant may then be dispensed with. The annual saving will be about $150 in wages, and an equal sum for board. The same rule applies to families that keep two, three, or even more servants. The use of gas enables the housekeeper to dispense with one servant. In these cases, then, the consumer could afford to pay 50 to 100 per cent. more for gas than his coal costs him.

Much more should be said on this subject, but fearing that I may be trenching upon ground covered by a paper that is to be presented during the session, I simply commend the subject as one worthy of your consideration.

This Association has for the last two or three years virtually stood committed in favor of State supervision of gas companies; the supervision, of course, to be accompanied by State protection against despoliation by so-called competing companies. Two years ago the outlook indicated that gas companies would soon present an almost solid front in favor of State gas commissions. The action of the American Association, in October, 1886, however, gave the movement a backset from which it will probably not soon recover.

To an unprejudiced mind it would seem that the work of the State Commission in Massachusetts should make converts in other States. The administration in that State seems to have given general satisfaction, both to gas companies and the public. The report of the Commission for 1887 furnishes interesting and valuable statistical information. It lays before the public the entire business of the gas companies of that State. This the opponents of commissions will say is not right. That the State has no more right to expose the business of gas companies than it has to expose the business of other corporations, or of private individuals. Perhaps this is true; but, upon the ground of expediency, gas companies may well waive the doubtful claim. If our patrons believe we charge too much for our product, that we pay enormous dividends, and that their only remedy is to invite competition, can we expect them to do less than avail themselves of such means as in their opinion will give relief and correct the injustice done to them? Now, can we not afford to show up the whole of our business with the understanding, should it appear that our business under economical management is not earning more than a fair revenue, that we shall be protected against raiders? It may be said the law of Massachusetts does not afford gas companies protection against competition. If it does not in law, it virtually does in fact.

There are few communities that would be willing to have their streets torn up by a competing company if it is shown that the established company is making gas as cheaply as it probably can be made, and that its net earnings will only pay a fair dividend on an honest capital. The public should not be ignorant of the fact that it will require less profits to pay interest on one capital than to pay interest on two capitals.

Among other interesting facts presented by the Commissioners' report is this: With a total capital stock of less than $12,000,000, the gas companies in Massachusetts are assessed for taxation by local assessors on the basis of more than $13,000,000. The total taxation assessed last year equaled 10.16 cents per thousand feet of gas sold. We sometimes hear it asserted that gas can be sold for less money than the taxes amount to in Massachusetts.

Not the least among the many advantages that gas companies, and especially gas managers, may derive from the statistics published by the Commission is that of being able to compare the work of their own company with that of other companies similarly situated. They are not only thus spurred up to emulate good work, but they are shown what actually may be done. Comparisons are possible of leakage, of yield per pound of coal, of quantity of enricher, of candle power, the yield per mouthpiece, and the quantity of gas made per man. Here the manager who obtains but 4.5 or 4.75 feet per pound from good gas coal can see that he falls 5 to 15 per cent. below the obtainable. He who obtains but 4,000, 5,000 or 6,000 feet per mouthpiece per day, may rest assured that he is obtaining but one-half, three-fifths or two-thirds the possible quantity. He who sells but half his coke is assured that he is consuming very much more than is necessary. I think an examination of the records would show the largest yield per mouthpiece in the works consuming the smallest percentage of the coke made.

In the many small works represented in our Association the item of labor is the largest expense entering into the cost of gas. In very many of these works the wages item might be reduced 25 to 33 per cent. by increasing the yield per mouthpiece from 5,000 to 8,000 feet per day, and in addition make a large saving in coke.

The cost of gas in the holder is not a difficult problem to determine; and yet there is as much diversity in the manner of ascertaining it as there is diversity in actual cost in the various works of the country. In the wages item one manager includes the labor in retort house, engine room, and purifying house? Another will add to these the salary of the foreman, the superintendent, the men who crush coke, the men who operate the ammonia works, the teamsters, carpenters and the blacksmith. While the latter manager may be managing his works with the greater economy, the former shows less cost for labor per thousand feet of gas. These questions, however, will probably be elucidated by Mr. Thompson, in his paper on "Gas Company Accounts." In this connection I would commend to the recent accessions to the ranks of gas managers, and to those who have not had the benefit of a technical education, a little book entitled "Manual for Gas Engineering Students," by D. Lee. It is sold for a few cents, and contains convenient rules for working out most of the problems which the managers of small works are expected to solve.

At our last meeting a special committee was appointed to investigate the desirability and the feasibility of establishing a Gas Institute. I am informed that the committee has not met with the encouragement that the importance of the question would apparently warrant. President Greenough, in his able address* to the American Association, at its annual meeting, in New York, last October, expressed views adverse to the establishment of such an organization as was contemplated by Mr. Egner in his paper presented to our last convention. Mr. Greenough suggested a plan intended to accomplish similar results, and which plan was adopted by the American Association. Mr. Greenough's plan possessed in a high degree the merit of simplicity; but although all the machinery was provided for carrying out the ideas suggested, I have not heard of a single demand having been made upon the gentlemen who were appointed when the plan or system was adopted. The various phases of

*See JOURNAL, Nov. 2 '87, p. 266.

the question, however, can be more intelligently discussed after we shall have heard the report of our committee.

Among the startling propositions that have appeared in our gas journals during the year I desire to notice two.

The first is the announcement by a gentleman of national fame as a writer upon philosophical questions, that the laws of physics and chemistry as they are now generally accepted must be revised. By experiment and observation he has determined to his own satisfaction that oxygen alone is a combustible, and that the elements—carbon and hydrogen—are only supporters of combustion. Again, he claims that by proper combination a gas can be made that when burnt in a properly constructed furnace, is entirely consumed; that is, there is no *product of combustion* other than *heat*. In other words, he has discovered that it is possible to annihilate substance.

The second startling proposition is made by a gas engineer well known to the fraternity. It is that 45,000 feet of water gas and 150,000 feet of good producer gas can be made from one and the same ton of coal. Americans do not like to be outdone. Those claims outstrip Valons' theory 100 to 1; in fact, they about equal the Keely motor, if not perpetual motion.

I call attention to these startling propositions for a twofold purpose. First, if they be true, that the parties may have the opportunity to elucidate their claims, and enlighten the less erudite members of our Association; and, second, if the claims are fallacious, that they may be relegated to the abode of fallacies.

At the suggestion of our worthy Secretary I desire to call the attention of members to the fact that the list of delinquents is growing rapidly. With dues fixed at the low price of $3 per year there does not seem to be any good excuse why members should be in arrears. I would suggest that the by-laws be so amended as to permit only those whose dues are paid to participate in the deliberations of the meetings; that the Board of Directors have power to order stricken from the roll of membership those who decline to pay up after being notified by the Secretary that they are in arrears for more than one year; and that it be the duty of the Secretary to drop from the membership roster the names of all members in arrears for three years' dues; and that the Directors have authority to reinstate any member who has been dropped for non-payment of dues, when such person shall have paid the full amount due at the time his name was stricken from the roll of membership.

I would also suggest that our laws be so amended as to fix the time for our annual meeting on the third instead of the second Wednesday of May. It is very inconvenient for many managers to leave home at a date earlier than the middle of the month.

Time's old Reaper has dealt gently with us in the past year. So far as has been reported death has invaded our ranks but once. N. W. Jones, the deceased, was an associate member, and one of the first to join our Association. I suggest that a committee be appointed to draft and report resolutions that shall fittingly set forth the esteem with which our brother was regarded by our membership, and expressive of our loss in his death.

In the preparation of this address I have attempted to make it utilitarian and general in its character. The discussion of abstruse problems in engineering mathematics, chemistry and physics has been avoided. These questions have been left for discussion in papers of a special character devoted to one subject, and will be presented by persons more competent to instruct you.

With undiminished faith in the future of our business, with a full consciousness of the fact that there is no other business known to men that is practiced with more respect for the rights of patrons, nor with so many safeguards against fraud by the dishonest and accidental error by fallible man as is that of the manufacture and sale of gas—let us enter upon the work of the Eleventh Annual Convention with a determination that the fraternity shall be enlightened, elevated, and the public benefited by our deliberations.

On motion, the address was referred, for consideration and report, to the following committee: Messrs. G. G. Ramsdell, W. H. Odiorne, E. G. Cowdery, J. M. Critchlow, Walton Clark, and G. McMillan.

Treasurer's Report.

Sec. and Treas. Littleton then presented the annual report of the Treasurer, of which the following is a synopsis:

Receipts.

Cash on hand, May 1, 1887	$228 50	
Membership fees	160 00	
Annual dues	435 00	
Total		$823 50
Receipts, brought forward		$823 50

Disbursements.

Salary of Secretary	$250 00	
Sundry bills, as per accompanying vouchers	299 70	
Cash on hand, May 1, 1888	273 80	
Total		$823 50

The Finance Committee having certified the report, it was, on motion, ordered to be placed on file.

Report from the Committee on the Proposed Formation of a Gas Institute.

Mr. Frederic Egner, from the Committee appointed at the last annual meeting to consider and report upon the advisability of establishing an American Gas Institute, presented the following:

To the Officers and Members of the Western Gas Association:—At the Tenth Annual Meeting of this Association it was regularly moved, seconded and carried that a committee be appointed, to be known as the "Committee on the American Gas Institute." The duties of the Committee were to be: That the said Committee should communicate with gas companies and officers of other Societies interested in the manufacture and sale of gas, and to do whatever seemed advisable, in order to learn if an institution of the kind proposed at the said tenth annual meeting of this Association was regarded favorably, or otherwise, by the people most interested in the matter; and if the whole, or a part, of the scheme was practicable. An appropriation of $50 was voted to aid the Committee in carrying out the wishes of the Association.

After consulting verbally and by letter, and reviewing all that was known to have been done in the direction of the proposed inquiry before the present time, the Committee concluded, as a preliminary measure, to address a circular letter to all the gas companies within the United States, briefly calling attention to the object of the inquiry of this Association, and respectfully asking that an accompanying question sheet be filled out and returned to the Committee. An addressed and stamped envelope was inclosed in each circular letter, and the latter inclosed in fully stamped and sealed envelopes, addressed (generally) to the officers of gas companies by their official titles, because the names of the persons intended to be reached were not known, in many cases. Copies of the papers sent are annexed to this report. "Goodwin's Directory of Gas Light Companies" was used to direct the letters. Over 960 of these communications were mailed, and only 130 have been heard from to date. Letters were written to the officers of the various Gas Associations throughout the country; but only the American Gas Light Association and the Guild of Gas Managers were kind enough to take any notice of our communications. Letters were also addressed to a number of gentlemen who, from time to time, have been looked upon as the leading gas men of the country. Some replied, and some did not. Considering that this Committee inclosed a printed question sheet, and an addressed, stamped envelope, which left the persons addressed nothing to do but a few scratches of a pen, which might be a simple "No," and that a large majority of the companies addressed took no notice whatever of the communication of the Committee of this Association, we have to report that, in our opinion, the gas companies of the United States cannot be united on any of the questions proposed in our letter; and that the idea of establishing an Institution, such as was intended, is not practicable. Of the replies received, the greater number favored the Institute, and promised financial aid. A detailed table of the answers received is annexed to this report.

Respectfully submitted,

E. J. King,
Sylvester Watts,
Frederic Egner. } Committee.

Discussion.

The President—This report is now before you for discussion.

Mr. King—While I fail to perceive much ground for discussion, I wish to bring to the attention of the Association the immense amount of work performed by Mr. Egner (which does not show at all in the report just read) in collecting the facts embodied or summarized in it. I do not think you fully realize what he has done. He has simply been indefatigable in his labors. I wish also to call attention to the fact that his expenditures, in accumulating the material necessary for the preparation of his report, have exceeded the sum ($50) appropriated by the Association for that purpose. I move a hearty vote of thanks to him for his labors; and that the Secretary be authorized to draw a warrant for whatever money Mr. Egner expended in excess of that set apart.

The President—Will Mr. King so modify his motion as to permit the *Committee* to be thanked?

Mr. King—As a member of that Committee permit me to say the

thanks of the Association are due to Mr. Egner alone. Having performed all the work, he is justly entitled to all the praise.

Mr. Egner—It is true I performed the clerical work connected with the getting up of the report—Mr. King, being in Jacksonville, while Mr. Watts was most of the time in Florida, they could not attend to it. Mr. King made at least one visit to St. Louis, when his presence helped me greatly, yet he has not said anything about it. What my expenses were in excess of the voted sum, I shall decline to say unless compelled so to do.

The President suggested that the motion should be so amended as to include in the warrant the expenses of the Committee; whereupon Mr. King explained that as he was enabled to transact personal business of his own, on the occasion of the visit to St. Louis mentioned by Mr. Egner, he would not listen to being reimbursed therefor.

The motion of Mr. King was then put to vote and carried.

On motion of Mr. Scofield the report of the Committee was accepted, and the members thereof discharged from further consideration of the subject.

APPOINTING SPECIAL COMMITTEES.

In Memoriam—to prepare a minute on the death of Mr. M. W. Jones, Chicago, Ills., an Associate Member.—Messrs. B. E. Chollar, C. M. Keller, J. M. Murphy, Geo. H. Tayler, and Geo. B. Burns.

On Place of Next Meeting.—E. H. Jenkins, T. Smith, R. D. Walsh, Z. T. F. Runner, and T. G. Lansden.

On Nomination of Officers.—Edward Lindsley, Jas. Montgomery, L. L. Kellogg, Jos. Light, and J. D. Thompson.

This concluded the arrangement of preliminary routine matters.

(To be continued.)

Air Supply to Boiler Furnaces.

The *American Engineer*, in a cleverly written editorial on this subject, says there are four general methods of effecting a draught in a boiler besides the ordinary one of relying upon the height, size and temperature of the chimney, flues and connections. The first of these is the older one of locating a steam blast within the chimney, in which principally the force of the discharge effects the upward movement of the products of combustion through the chimney, assisted to a certain extent by the additional heat conveyed by the discharged steam. The value of this steam should be considered as an important item in an estimate of the cost for operating the boiler, since the heat of the steam must come originally from the furnace, and being used for the purpose of heating and moving the products of combustion up the chimney, and for no purpose outside of the boiler, it necessarily forms a portion of the net cost of operation. A second method consists in closing the ashpit and supplying the furnace with a forced blast; a third method, almost identical with the second, consists in closing the fire-room against all outward communication of air, except through a blower or fan, and raising the pressure of the air in the fire-room above that of the outside atmosphere, the only outlet being through the furnaces. The only difference between these two being that the fire-room and furnace are made a part of the second system, while the first system provides direct communication to the furnace independent of the fire-room. The cost of operating this air supply system should, of course, be considered as part of the cost of operating the boiler plant. The third system has the advantage of providing a better circulation of air in the fire-room a feature fully appreciated by the firemen engaged. The fourth system consists in applying a fan within the chimney or one of its connections, whereby the air-blast is drawn through the furnace and boiler connections on the one side, and forced up or through the chimney and connections on the other. The cost of operating this fan should, like the others, be charged to boiler operation. This latter plan has simplicity for its advocate, since no special appliances, other than the fan and the means for operating it are necessary, the closed spaces in which the air is necessarily required to act being already provided, while in the others the fire-room as a whole, or the means of making direct a tight communication with the ashpit, have to be provided. Again, where pressure is used in the movement of the air to and through the furnace, numerous eddies and counter currents are developed in the corners and portions not in a direct line of the passage of air, whereas with the chimney suction the air is drawn directly to and through the furnace and flues without stopping on its way to fill up the by-ways and corners with counter currents. Air being an elastic medium, a push is not so effective as a pull, and every opening in the fire-room is a means of air supply to the furnaces. As good if not better ventilation is effected as with the compressed air process, and all the furnaces get their proper quota of air for their special use.

The fourth method was some years since made the basis of an extravagant claim of doing away with the chimney altogether. The claim, when sifted down to actual facts, was found to be merely a reduction in the diameter of chimney, which was, of course, permissible in proportion to the capacity of the fan to force the products of combustion to an exit. The harder the fan was driven and the greater its capacity the smaller the chimney might be, but still a chimney there had to be. Unfortunately these extreme views of "no chimney" were seconded by well-prepared but non-meaning reports of experts, and the scheme was boomed for awhile as a "grand improvement of the age," instead of being pronounced the extravaganza that it was. It was a scheme, however, and money passed from one pocket to another, to the disadvantage of some and the gain of others; how honest the movement it is best not to state.

This is but one in a thousand, even in furnace improvements. There are methods upon methods for supplying air, hot and cold, in the furnace and out of the furnace, all based upon these four general and well-known features of supplping air to the furnaces. Walls are punctured here and there with openings and flues, pipes are run through the connections to the bridge walls or sides of the furnace—all to furnish mysteriously tempered hot air to the furnaces, whereby the usual 33⅓ per cent. (never more, never less) is saved, all unmindful of the fact that whatever heat is applied to these improvements (?) is taken originally from the furnace through the walls or connections. All these so-called improvements were brought out, developed, and used generations ago, and all since abandoned, only to rise again as the toad-stool to poison and disgust those who use them, because of their similarity to the more valuable and attractive mushrooms of successful use.

Under ordinary land practice, where there is ample room for a properly constructed furnace of ample proportions, with easy discharge of products of combustion through a chimney of proper capacity, is all that is needed, and is the best for economical practice. With this and a competent and careful operator, there should be no complaint and no cause for complaint. A good fireman can make his furnace and boiler what he likes—a success or a failure; and if thoroughly posted in his work can often develop good results where only bad ones might be expected.

Natural draught, or that obtained by the tendency of the heated air to rise, is much influenced by the size of the flue through which it moves. The flue or chimney should never be so small or so crooked as to become choked, or so large that the gases shall become cooled before they escape. The draught of a chimney is due to the difference in density or weight per cubic foot of the gases of combustion from that of the outside air. The greater the difference the quicker the movement, and the higher the temperatures the lighter or less dense are the gases; so that for a good draught the gases must not leave the connections at too low a temperature. On general principles the draught area of the tubes and flues should not be less than one-eighth the area of the grate, and the area of up take or chimney should be 20 per cent. greater than that of the tubes or flues. The height should be governed by the surroundings, that the chimney shall reach well above everything about it. Otherwise it is immaterial beyond 60 to 80 feet. With a fixed height of chimey the area in square feet can be arrived at by dividing the area of grate in square feet, plus 10, by the square root of the height of chimney.

THE Portland (Me.) Gas Company, at a meeting held on the 10th inst., voted to make a 10 per cent. reduction in selling rates, the same to take effect on July 1st—a sort of preliminary to the usual Independence Day celebration. This means a net rate of $1.80 per thousand. At the same meeting a quarterly dividend of 2½ per cent. was declared. In the meantime the Finance Committee of the City Council has advertised for proposals for the purchase of the 1700 shares of stock now held by the city in the Company. Bids should be made in writing, and be addressed to the Mayor (Chas. J. Chapman), in his capacity as Chairman of the said Finance Committee. The bids must be sent in before next Sunday.

THE Ocala (Fla.) Gas Light and Coke Company has been incorporated, with a capital of $20,000.

A Prominent English builder recently advertised for a clerk and received some hundreds of replies. Selecting about 10 names for personal interview, the first of the chosen to arrive sent in a card on which was printed, "Mr. Thos. Caston," the name being followed by the letters "S. I." After hearing all the applicant had to say, and feeling quite sure he would not do, he said before dismissing him: "Are you connected with India at all?" "Oh, no," said Mr. Caston, "I have never been out of England." "Will you be good enough to tell me, then, what the letters S. I. mean after your name? I thought perhaps it meant Star of India." "Oh, no," said the applicant; "I am a civil engineer, you know, and the letters are simply the initials of the two words." The builder smilingly bowed out the applicant.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

Editor—JOS. R. THOMAS, C.E.
Asst. Editor—T. J. CUNNINGHAM
Manager—C. E. SANDERSON.

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WEDNESDAY, MAY 16, 1888.

The Market for Gas Securities.

The city market presented nothing of unusual moment within the fortnight. Consolidated held its own fairly, and Mutual moved up somewhat sharply. It looks tempting to us even at present prices. Brooklyn shares are on the mend, the Lindley Murray Gunnison Combination seeming to have attracted the attention of investors to the cheapness of solid stocks at ruling figures. The Metropolitan Company is about to issue $250,000 bonds to run 10 years, and bear 5 per cent. interest. The money will be used in plant betterments, the bulk of the expenditure to go, we presume, in main substitution. This Company's district, particularly in the division bounded by 5th and 9th avenues, and Bergen and 9th streets, has grown with amazing rapidity. The building improvement is of the most substantial sort. The event in Eastern matters was the circular issued by a committee of the Boston Company's shareholders who solicited other shareholders to pool their stock for the purpose of disposing of it at a figure not less than $240 on each $100 of par value. We can only repeat what we have often said before that old Boston stock is worth more to its present holders than it is to anyone else. In other words, if it is worth $240 to speculators it is worth more than that to *bona fide* investment holders. The Portland (Me.) Gas Company has declared a dividend of $2.50 per share, payable June 1st; despite this pleasant quarterly reminder, the city is in the market as a seller of 1700 shares. Mr. Jno. P. Ryan, who controls the Columbus, Miss., Gas Company, has purchased a controlling interest in the Shreveport, La., Gas Company. Dr. Edwin Ellis has been re-elected President of the Ashland (Wis.) Lighting Company. The proprietors will expend (out of earnings) $8,000 on plant betterments this season. We understand that a controlling interest in the Meridian (Miss.) Company has been purchased by parties at present unknown to us. The transfer was made in the viciuity of 85, and was a good one for the buyers.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks.
16 WALL ST. NEW YORK CITY.
MAY 16.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	75	—
Central	440,000	50	30	—
" Scrip	220,000	—	47	57
Equitable	4,000,000	100	105	108
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	115	118
Mutual	3,500,000	100	91	93
" Bonds	1,500,000	1000	101	103
Municipal, Bonds	750,000		—	—
Northern	125,000	50	30	—
" Scrip	108,000			
Yonkers		50	—	80
Richmond Co., S. I.	300,000	50	55	60
" Bonds	12,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	103	105
Citizens	1,200,000	20	56	58
" S. F. Bonds	320,000	1000	—	103
Fulton Municipal	3,000,000	100	132	135
" Bonds	300,000		-	1-6
Peoples	1,000,000	10	71	72
" Bonds (5's)	368,000	—	97	—
" " (6's)	94,000	—	100	—
Metropolitan	1,000,000	100	79	80
Nassau	1,000,000	25	100	103
" Ctfs	700,000	1000	98	100
Williamsburgh	1,000,000	50	124	128
" Bonds	1,000,000	—	111	112
Out of Town Gas Companies.				
Boston (Mass.) Gas Co	2,500,000	500	200	—
Buffalo Mutual, N. Y.	750,000	100	90	95
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	140	145
" " Bonds.	45,000	—	—	—
Chicago Gas Trust	25,000,000	100	34¼	35¼
Cincinnati G. & C. Co.	6,000,000	100	179	180
Consumers Toronto	1,000,000	50	192	—
Central, S. F., Cal.			—	84
Capital, Sacramento, Cal.			58	60
Consolidated, Balt.	11,000,000	100	47	47¼
" Bonds	6,400,000		107	107½
Hartford, Conn	750,000	25	—	138
Jersey City	750,000	20	165	170
Laclede, St. Louis, Mo.	2,000,000	100	118	122
Louisville, Ky	2,570,000	50	125	130
Little Falls N. Y.	50,000	100	—	100
" Bonds	25,000	—	100	103
Montreal, Canada	2,000,000	100	210	214
Memphis (Tenn.) Gas	750,000	100	48	51
" Bonds.	240,000	100	103	—
New Haven, Conn		25	193	197

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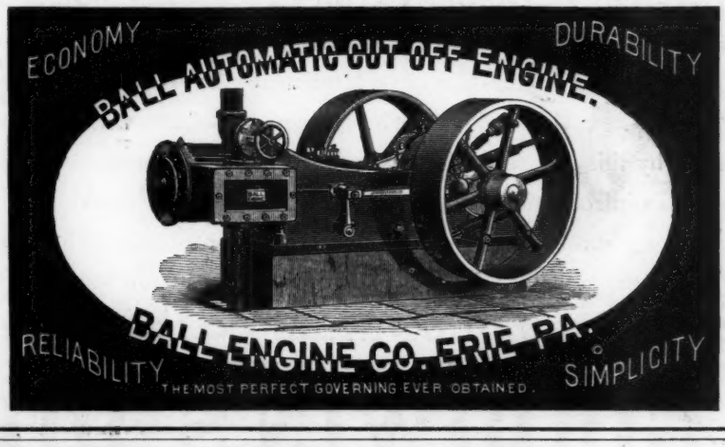

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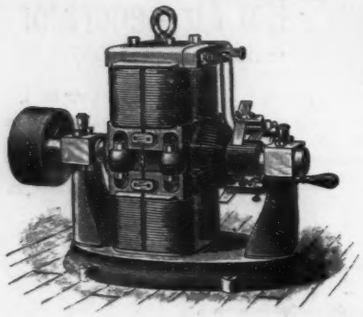

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A very general demand exists, in both large and small Gas Works, for an apparatus that will be absolutely efficient in the removal of the tar which passes the hydraulic main and condenser. Many attempts have been made to accomplish this, but, I believe, without success, until the introduction, five years ago, in England, of the C. & W. Walker Patent Tar and Carbonic Acid Extractor. During these years this apparatus has been adopted by many of the most prominent Engineers, not only in England, but also on the Continent of Europe and in other parts of the world. It is only necessary to give here a partial list in order to convince any intelligent American Gas Engineer that this machine must have succeeded fully in accomplishing the desired results.

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Mr. Charles A. Gerdenier, Superintendent of the Bridgeport (Conn.) Gas Light Company, writes as follows, under date of Dec. 3, 1887:

"The C. & W. Walker Tar and Carbonic Acid Extractor has been in operation at these works for the past six weeks, and is an unqualified success. It removes every particle of Tar from the gas in once passing through the apparatus and a large percentage of the Carbonic Acid. I also feel quite sure that it prevents the formation and deposit of Naphthaline, because since I started the Washer I have had no stoppages from this cause. These works have been seriously troubled with Tar for many years, and I have used several kinds of apparatus and every expedient which has come to my attention for dealing with the difficulty, but without success. The Walker apparatus occupies comparatively small space, is less expensive than other systems, and requires but little attention. I carry 2½-inch seal, and have an automatic tar delivery valve. This Tar Extractor is indispensable to gas makers."

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JOHN H. McELROY, Engineer.

ALLEGHENY, PA., Sept. 24, 1887.

GEO. SHEPARD PAGE, ESQ.:

Dear Sir—By the use of the "Standard" Washer-Scrubber we have been able to increase the income from our ammoniacal liquor 33 per cent. The "Standard" is doing satisfactory work. Yours truly,

ROBT. YOUNG, Eng. and Supt.

OFFICE COLUMBUS GAS LT. AND COKE CO., COLUMBUS, OHIO, October 14, 1887.

GEORGE SHEPARD PAGE, ESQ.:

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Yours truly, E. McMILLIN, V. P. & Gen. Mangr.

GEORGETOWN, D. C., Sept. 27, 1887.

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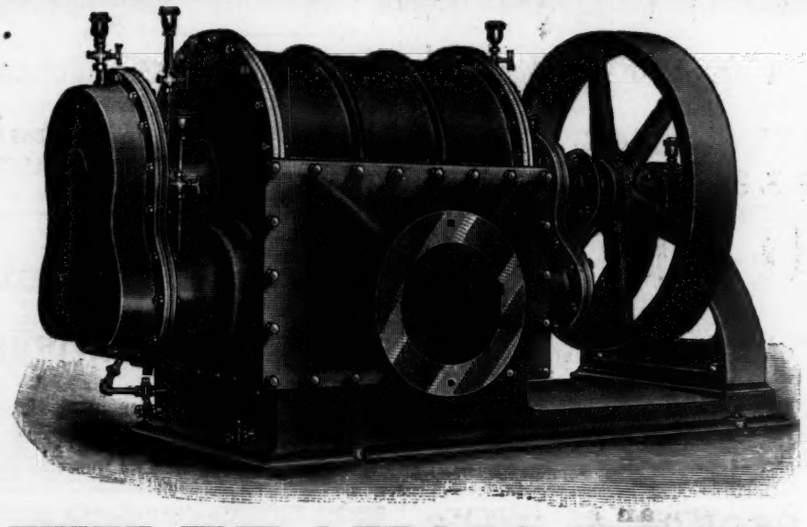

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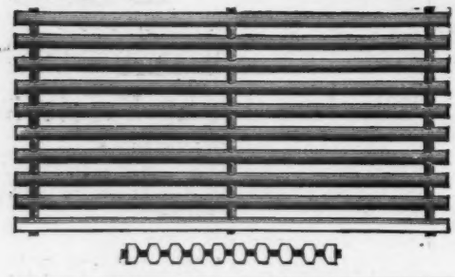

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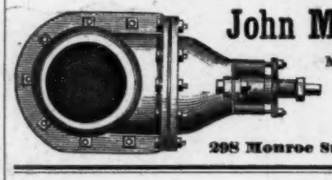

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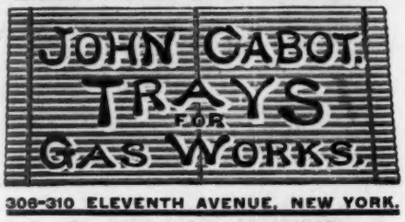

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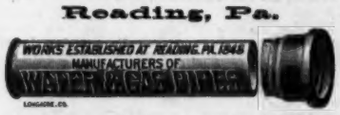

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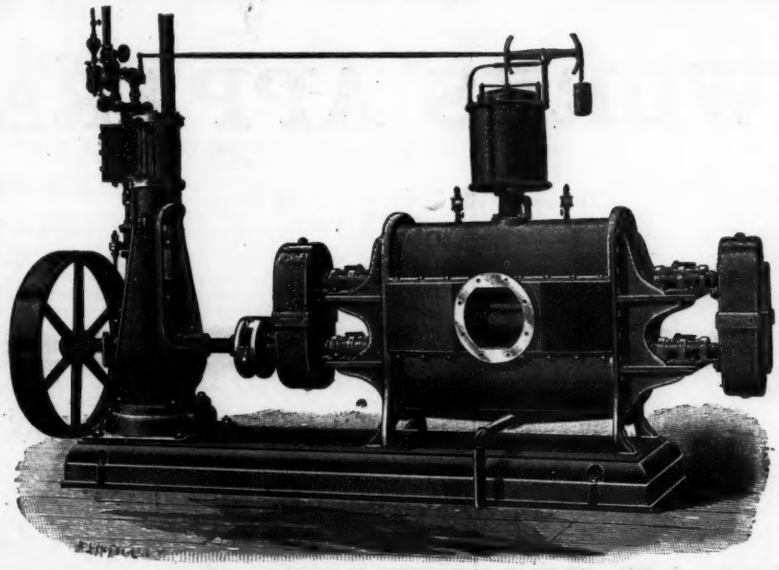

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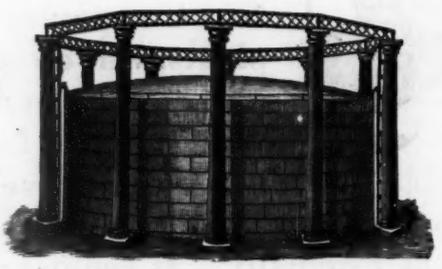

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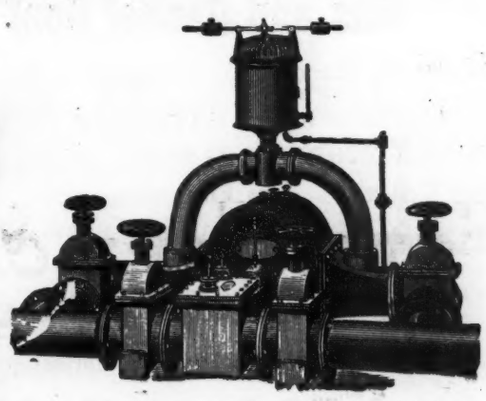

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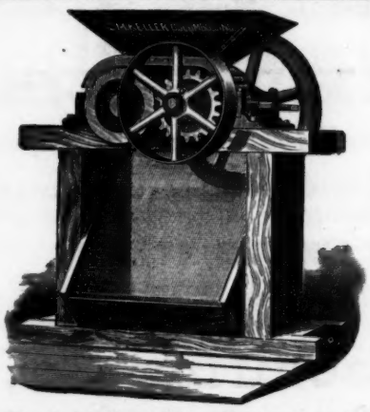

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Washington Gas Company, Washington (Davies Co., Ind.)	1	"	25	" "	....	" " "
Nashua Gas Company, Nashua (N. H.)	1	"	15	" "	....	" " "
Borough of Stamford, Stamford (Conn.)	3	"	15	" "	....	Sewage Works.
" El Paso, El Paso (Texas)	(In course of erection.)					
Gas Company, Prague (Austria)	3	Engines,	150	Horse Power.	....	Electric Light Plant.
" " Carlsbad (Bohemia)	2	"	60	" "	....	" " "
" " Frankfort-on-the Main (Germany)	2	"	100	" "	....	" " "
" " Coblenz (Germany)	3	"	120	" "	....	City Water Works.
" " Duren (Germany)	2	"	80	" "	....	" " "

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Russian Powder Manufacturing Company, Schlüsselburg	17	"	194	" "
Pfeifer & Lanen, Beet Sugar Factory, Elsdorf (Germany)	6	"	191	" "
Mining Company of Metternich, Metternich (Germany)	7	"	174	" "
M. H. Wilkens & Sons, Silverware, Hemelingen (Germany)	3	"	77	" "
The Beet Sugar Manufacturing Company, of Baden, Waghäusel (Germany)	1	"	60	" "

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ADVANTAGES to Gas Companies combining Gas with Electric Lighting over those furnishing Electric Lighting only.

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